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OUR 63rd YEAR

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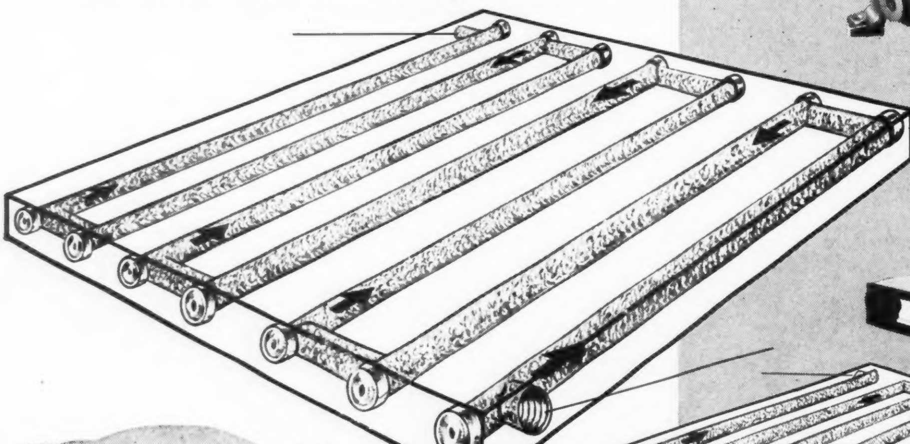

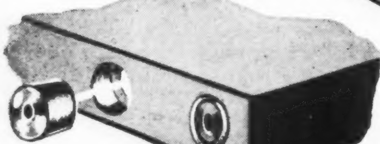

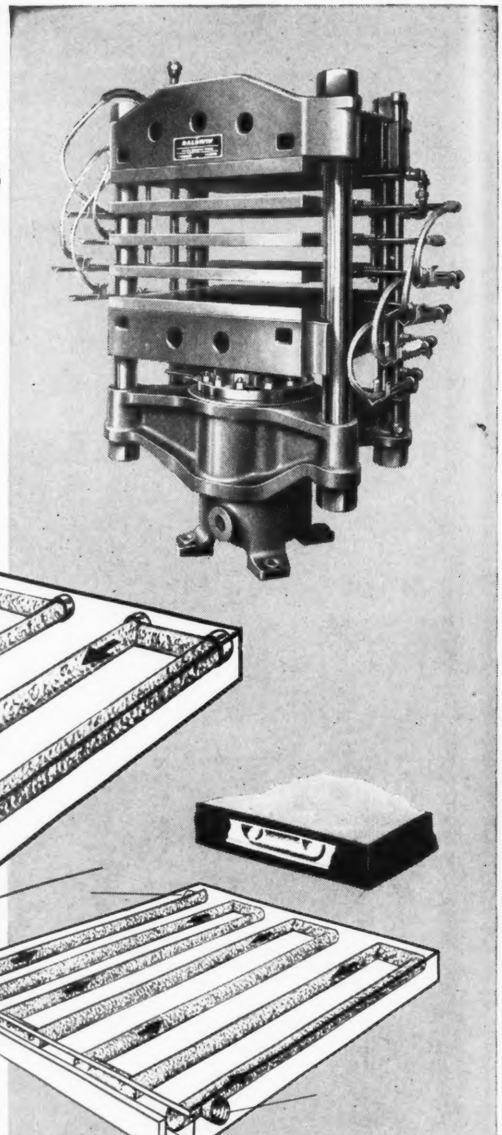

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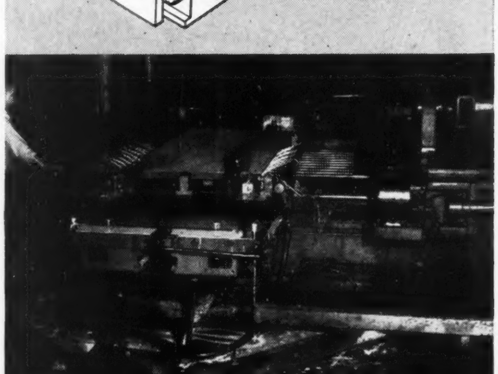

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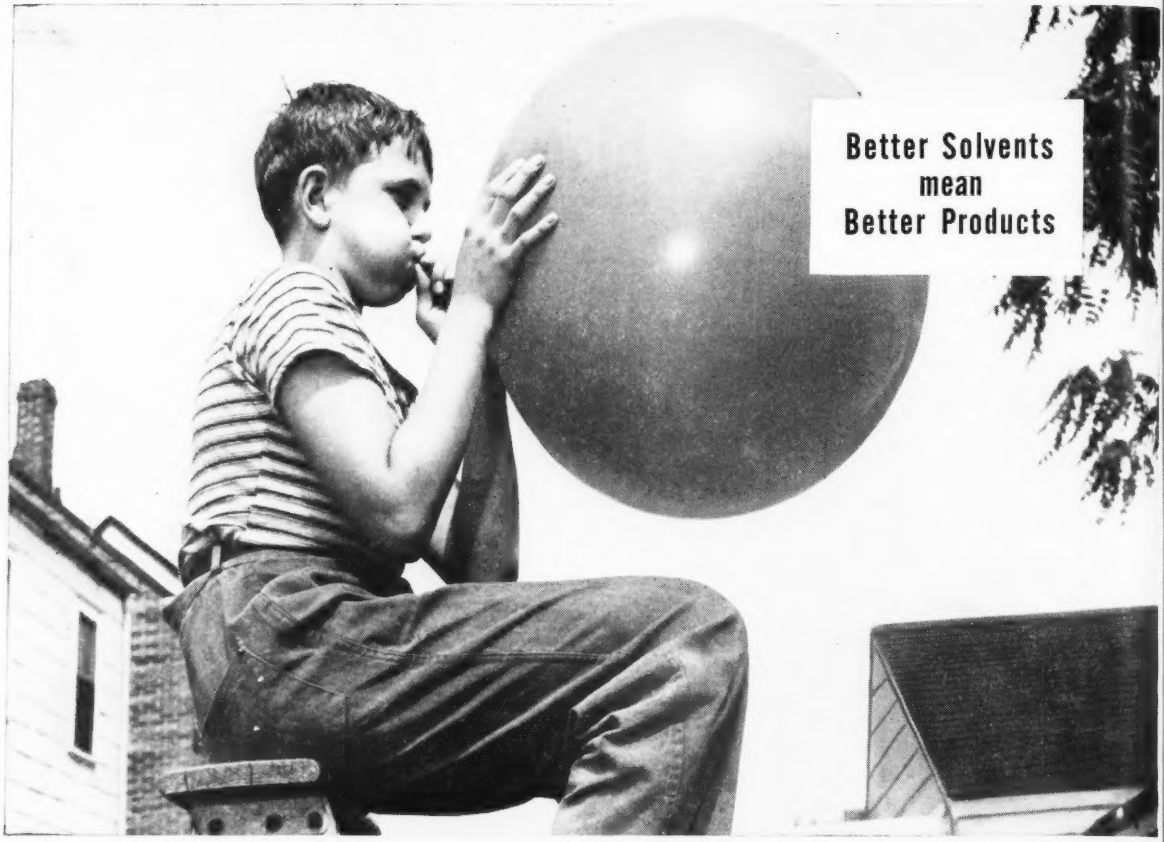

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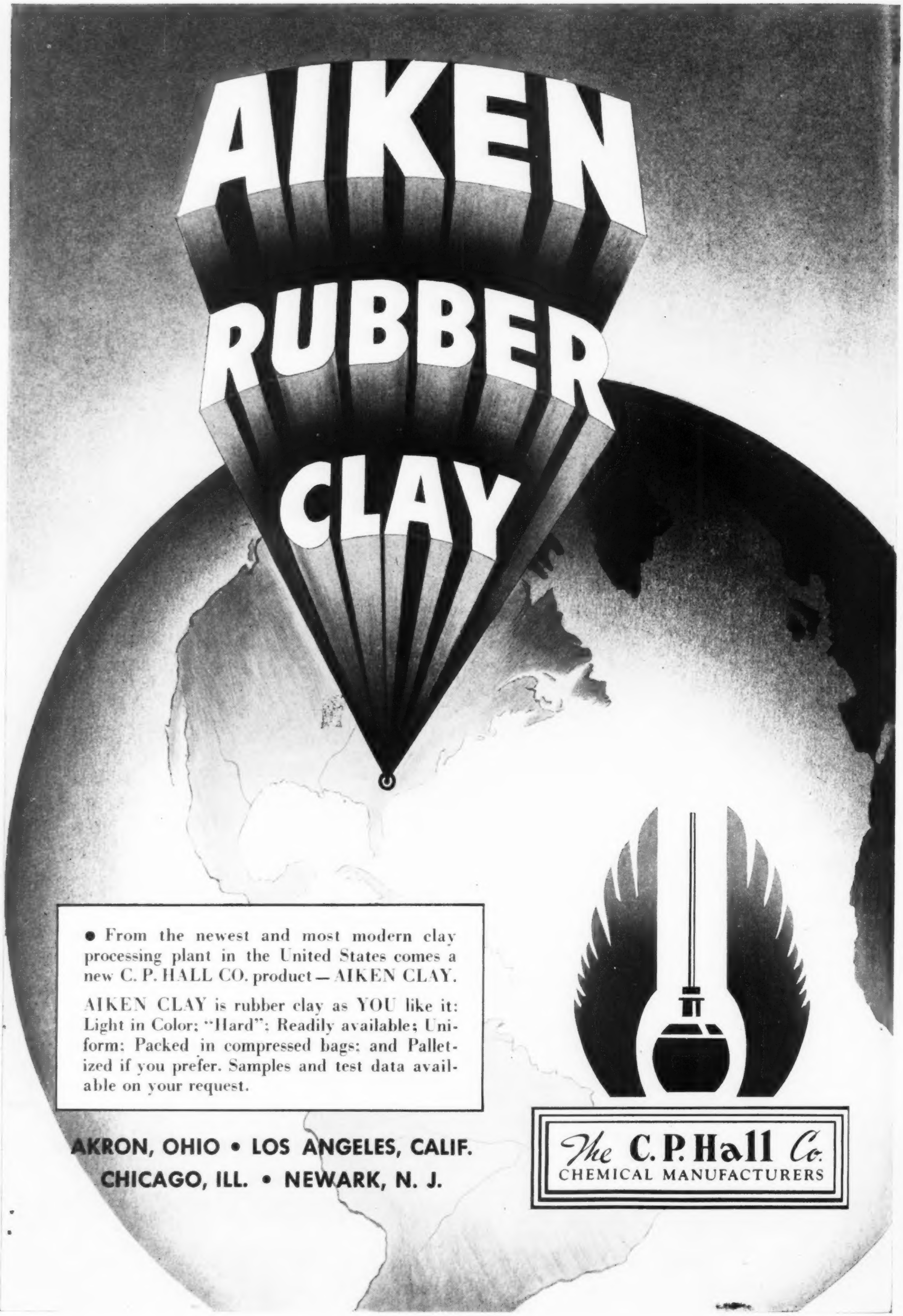
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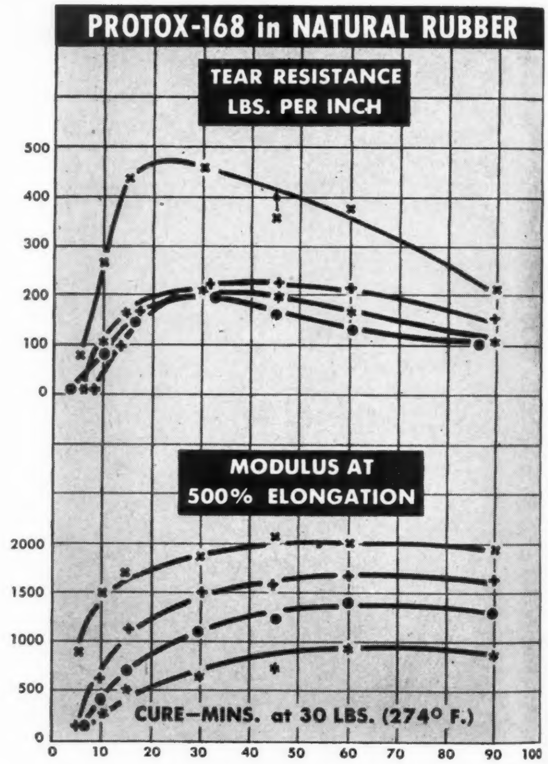

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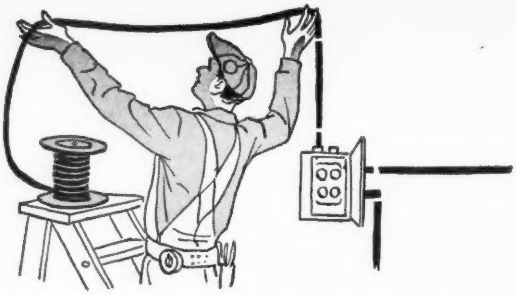

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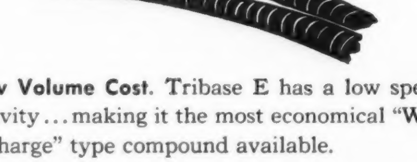

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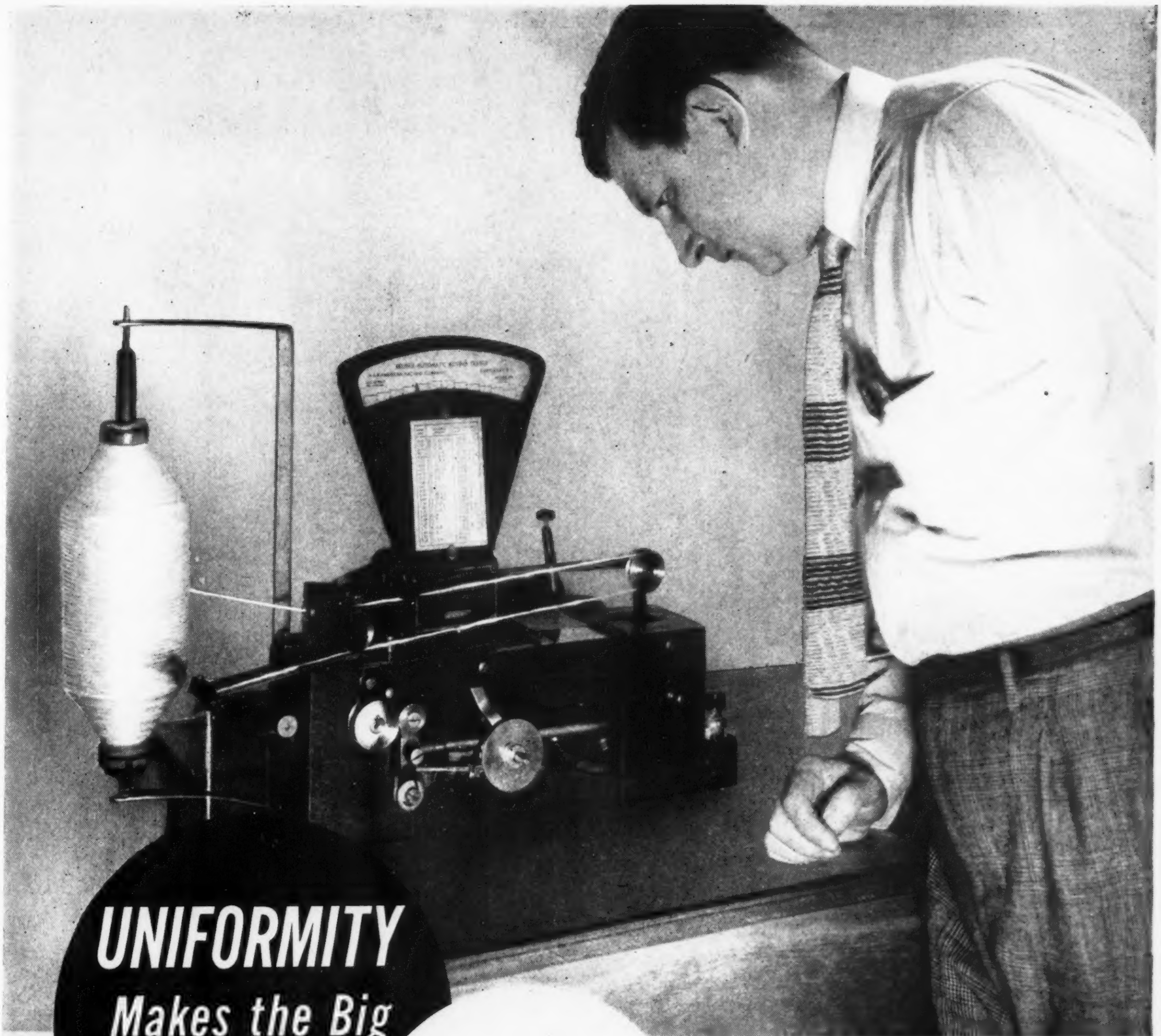

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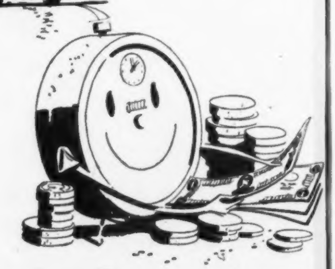

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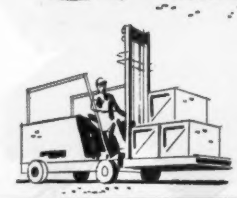

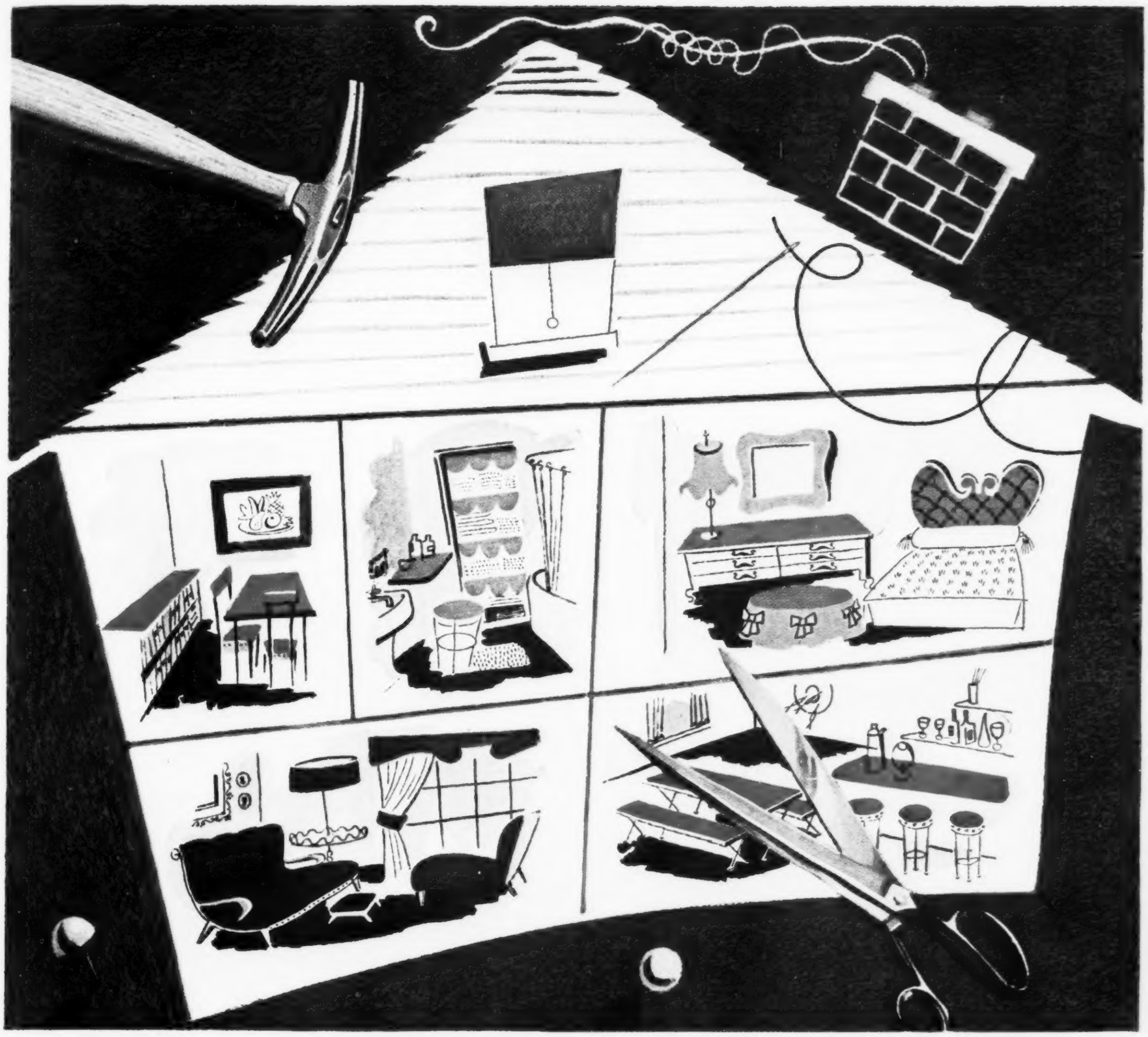

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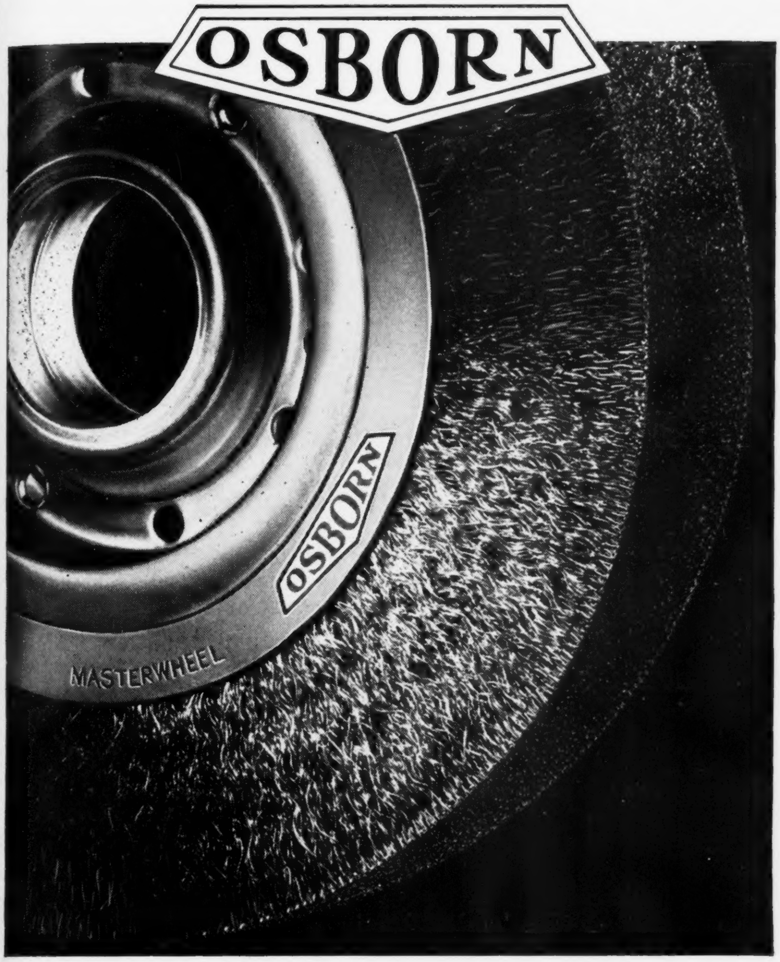

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INDIA
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VOL. 126,—NO. 4 JULY, 1952

Hydrocarbon Composition of Rubber Processing Oils[1]

S. S. Kurtz, Jr.,[2] and C. C. Martin[2]

OIL-EXTENDED rubber is now being made in which 25 parts or more of oil are added based on 100 parts of the butadiene-styrene copolymer. Since oil-extended synthetic rubber is actually superior in heat build up and other properties to the regular GR-S synthetic rubber, it is to be anticipated that oil of petroleum origin will become a major raw material for the synthetic rubber industry.

The question of how much the composition of the petroleum oil influences the quality of the oil-extended rubber is currently under investigation. The purpose of this paper is to describe the types of hydrocarbon molecules present in rubber processing oils from petroleum and to give a brief outline of the methods which can be used for getting such information.

Our present knowledge of the composition of the higher molecular weight portion of petroleum, which includes rubber procesing oil and lubricating oil, is based mainly on the work of Waterman and associates (1-4)[3] in Europe, and in this country on the work of American Petroleum Institute Project 6 under F. D. Rossini (5-7), and API Project 42 under R. W. Schiessler (8). Significant contributions have also been made by Fenske (9) and Dennison (10), and many others as discussed in the references cited in (4, 11, 12).

This mass of work, particularly the work of API Project 6, has shown that dewaxed viscous oil consists mainly of multi-ring compounds with alkyl side chains. Figures 1 and 2 are examples of possible structures each having 31 carbon atoms. These figures, however, show more structural detail than can be determined with certainty at present. Some molecules (Figure 1) contain only saturated rings and alkyl side chains; other molecules (Figure 2) contain saturated rings, aromatic rings, and alkyl side chains. Molecules without rings are entirely absent or present in only small amounts in dewaxed petroleum oil.

The molecular structures shown in Figures 1 and 2 are, of course, only examples of types; in an actual rubber processing oil or lubricating oil there can be a great variety of combinations of aromatic rings, saturated rings, and alkyl side chains.

It should also be pointed out that rubber processing

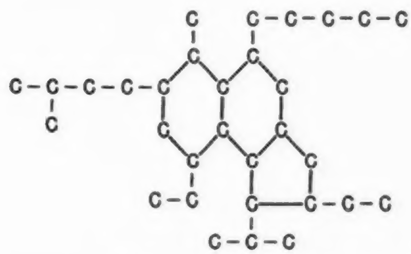

Fig. 1. Example of Possible Structure of Naphthene Hydrocarbon

Number of Naphthenic Rings	$(R_N) = 3$
Carbons	$= 13$
% of Naphthenic Carbons	$(\%C_N) = 42$
Number of Paraffinic Carbons	$(C_P) = 18$
% of Paraffinic Carbons	$(\%C_P) = 58$

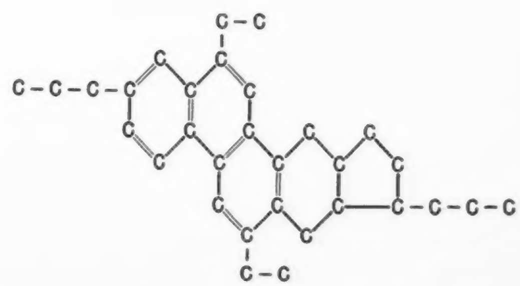

Fig. 2. Example of Possible Structure of Aromatic Hydrocarbon

Number of Aromatic Rings	$(R_A) = 3$
Carbons	$= 14$
% of Aromatic Carbons	$(\%C_A) = 45$
Number of Naphthenic Tings	$(R_N) = 2$
Carbons	$= 7$
% of Naphthenic Carbons	$(\%C_N) = 23$
Number of Paraffinic Carbons	$(C_P) = 10$
% of Praaffinic Carbons	$(\%C_P) = 32$

[1]Presented before the Division of Rubber Chemistry, A. C. S., Cincinnati, O., May 1, 1952.
[2]*Sun Oil Co., Norwood, Pa.*
[3]Numbers in parenthesis refer to Bibliography items at end of this article.

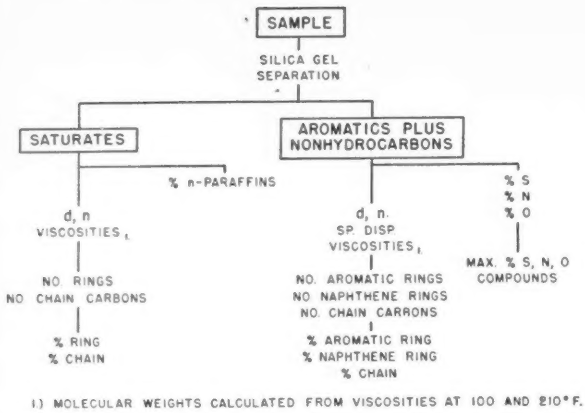

Fig. 3. Scheme of Analysis for Processing Oils Used by Sun Oil Co.

oil may contain sulfur, nitrogen, and oxygen compounds, but that these are usually minor components. The question of the presence or absence of olefinic unsaturation in petroleum fractions prepared by simple distillation (i.e., without cracking) also must be mentioned. The careful work of API Project 6 has failed to show the presence of olefins in the fractions from Ponca, Okla., crude. Recently data have been presented (13-15) showing a small amount of olefinic unsaturation in some Pennsylvania crudes. Whether or not these olefins existed as such in the crude oil in the ground or were formed by the decomposition of unstable compounds is still the subject of debate.

Recently Rostler (16) expressed the opinion that olefinic unsaturation and tertiary hydrogens, rather than aromatic rings, account for much of the reactivity of petroleum oils. However Rostler presents little data in support of this opinion and ignores the large mass of evidence which proves beyond doubt the presence of aromatic rings in lubricating oil. For example, ultra-violet spectra obtained on the aromatic fractions of viscous petroleum oils show the presence of the naphthalene nucleus. There is also a band, which is probably characteristic of the phenanthrene nucleus. Rostler's so-called "acidaffins" (17) are certainly predominately aromatic hydrocarbons. We believe that the amount of olefinic unsaturation in straight run rubber processing oils is negligible.

Coming back to the structures shown in Figures 1 and 2, it is worth while to consider how one would describe the composition of such molecules in analytical terms, since several types of nomenclature and symbols are in current use. These are:

(1) Molecular type analysis
(2) Average molecule analysis (including ring analysis)
(3) Carbon distribution or carbon type analysis

Molecular Type Analysis

Molecular type analysis gives the composition based on the percentage by weight or volume of molecules which are aromatic, naphthenic, paraffinic, or olefinic.

An aromatic hydrocarbon is one that contains at least one benzene ring.

A naphthenic hydrocarbon is a saturated hydrocarbon molecule that contains at least one saturated ring.

A paraffinic hydrocarbon is a saturated hydrocarbon molecule that contains no ring structure.

An olefinic hydrocarbon is an unsaturated hydrocarbon molecule that contains at least one ethylenic double-bond.

The molecule shown in Figure 1 is clearly a naphthene; therefore in a molecular type analysis a sample of this type would be reported as "100% naphthenic hydrocarbons."

The molecule shown in Figure 2 contains three aromatic rings and two naphthenic rings. The molecule is therefore both an aromatic and a naphthene, but on a molecular type basis a sample of this type would be reported as "100% aromatic hydrocarbons."

A fifty-fifty molar mixture of these two molecules would be referred to on the basis of molecular type analysis as 50% aromatic and 50% naphthenic.

Average Molecule Analysis

Average molecule analysis gives the composition of the mean molecule in terms of number of aromatic rings (symbol R_A), number of naphthene rings (symbol R_N), and number of paraffinic chain carbons (symbol C_P). The determination of the number of rings is usually called ring analysis.

For the naphthene in Figure 1, the value of R_N is 3 and the value for C_P is 19. For the aromatic in Figure 2, R_A is 3; R_N is 2; and C_P is 10. For a fifty-fifty mixture of these molecules R_A would be 1.5; R_N would be 2.5; and C_P would be 14.

This point is worthy of serious consideration since, if only the ring analysis is available on such a mixture, a somewhat misleading idea of the composition would be obtained. If we separate the aromatics and naphthenes, and determine the ring analysis of the aromatic fraction and of the naphthenic fraction, we have a far clearer mental picture of the composition of the oil than if we have only the average ring analysis for the whole mixture. It is known that the aromatic molecules and the naphthenic molecules differ greatly in physical properties and chemical reactivity. These two types of molecules may behave quite differently in rubber.

Carbon Type Analysis

Carbon distribution or carbon type analysis is reported in terms of the percentage of the total number of carbon atoms in the molecule which are in a given type of structure. On this basis the naphthene in Figure 1 has 13 carbon atoms in naphthenic rings out of a total of 31 carbon atoms; therefore $\%C_N=42$. Likewise, this molecule has 18 carbon atoms in paraffinic chains; so $\%C_P=58$.

For the aromatic molecule in Figure 2, $\%C_A=45$, $\%C_N=23$, and $\%C_P=32$.

A fifty-fifty molar mixture of these two molecules, on the basis of carbon distribution analysis, would be reported as having the following composition: $\%C_A=22\frac{1}{2}$; $\%C_N=32\frac{1}{2}$; $\%C_P=45$.

All of the above methods of reporting the composition of lubricating oil are valid, but since the numbers in each case are quite different, it is important in considering numerical composition data to be sure which system of reporting is being used.

Analysis of Three Typical Oils

To illustrate this discussion three oils were selected which have about the same molecular weight as widely used rubber processing oils and which have relatively aromatic, relatively naphthenic, and relatively paraffinic compositions. The properties of the oils selected are given in Table 1.

Gravity, aniline point, viscosity index (18), viscosity gravity constant (19), and viscosity are commonly used as indicative of the composition of petroleum oils. In gen-

eral, the first three decrease with increasing aromaticity, and the last two increase with increasing aromaticity.

TABLE 1. DATA ON WHOLE OILS

Oil	Relatively Aromatic	Relatively Naphthenic	Relatively Paraffinic
Inspection Data			
Gravity API at 60° F.	11.8	23.3	30.4
Specific gravity 60°/60°F	.987	.914	.874
Aniline point—°F.	133	220.8	222.1
Pour point—°F.	+55	+5	0
Flash point—°F	473	455	440
Fire point—°F.	550	520	490
NPA color	>8	5½	1½
Vacuum distillation–Engler–10 mm.			
IBP	467° F.	485° F.	465° F.
10%	547° F.	537° F.	492° F.
50%	593° F.	558° F.	519° F.
90%	660° F.	614° F.	557° F.
98%	700° F.	640° F.	581° F.
% Carbon	87.5	86.6	86.2
Hydrogen	10.9	13.3	13.7
Sulfur	0.62	0.06	0.08
Nitrogen	0.21	......	0.002
Oxygen (by difference)	0.8	probably less than	0.05%
Other Physical Properties			
Density, d_4^{20}	0.9837	0.9105	0.8704
Refractive index, n_D^{20}	1.5550	1.4971	1.4793
Specific dispersion*	188.3	104.3	103.6
Refractivity intercept, n-d/2	1.0631	1.0419	1.0441
Viscosity 100° F., centistokes	3130	273	45.7
210° F.. Centistokes	38	15.2	6.35
100° F., Saybolt seconds	14,500	1260	212
210° F., Saybolt seconds	178	78.5	47
Index	—119	37	94
Gravity constant	0.927	0.842	0.815
Molecular weight	427	464	419

*Specific dispersion $= \dfrac{n_F^{20} - n_c^{20}}{d_4^{20}} \times 10^4$

In view of the complex nature of viscous oils, the problem of analysis is a difficult one. No industrial laboratory can afford the very thorough type of analysis carried out by API Project 6. A relatively short procedure for obtaining this type of information has been discussed by Lipkin *et al.* (20). Various other analytical methods proposed for obtaining information on the compositions of viscous oils by short-cut procedures have been discussed at length by Van Nes and Van Westen (4). Therefore no review of the literature is included in this paper.

The method of analysis used on the three oils is outlined in Figure 3. It involves three steps as follows:

(1) Separation of the aromatic fraction from the saturated fraction by silica gel (molecular type analysis).

(2) Determination of the composition of the saturated fraction (average molecule analysis and carbon type analysis).

(3) Determination of the composition of the aromatic fraction (average molecule analysis and carbon type analysis).

Experimental Details

The basic separation of the saturates from the aromatics is carried out by percolating 100 cubic milliliters of sample through 1000 grams of 28- to 200-mesh silica gel[4] in a simple two-inch diameter glass column, washing out the saturate with pentane, and desorbing the aromatics with benzene and methanol. The details of this method have been published by Lipkin, Hoffecker, Martin, and Ledley (21). This method gives a good separation of the aromatics from the non-aromatics or saturates.

The saturate fraction (Table 2) is analyzed by determining the percentage of n-paraffins by the urea adduct method of Zimmerschied, Higley, and Lien (22). On most dewaxed oils the % n-paraffins is so small that the rest of the analysis of the saturate fraction can be carried out on the whole saturate fraction without separation of the n-paraffins.

Density, refractive index, and viscosity are obtained on the saturated material. From these properties the number of rings per molecule is calculated by the method of Vlugter, Waterman, and Van Westen (1). The % ring is calculated by the method of Lipkin, Martin, and Kurtz (23). The latter value is calculated making the assumption that naphthenes in petroleum are a mixture of condensed and non-condensed ring structures; hence there is some uncertainty in the % ring value.

[4]Davison Chemical Co. Code 12 silica gel.

TABLE 2. DATA ON SATURATED FRACTIONS SEPARATED BY SILICA GEL

Oil	Relatively Aromatic	Relatively Naphthenic	Relatively Paraffinic
Wt. % of whole oil	22.5	84.3	85.6
Density, d_4^{20}	*0.8960	0.9020	0.8616
Refractive index, n_D^{20}	*1.4901	1.4906	1.4735
Refractivity intercept, n-d/2	1.0421	1.0396	1.0427
Viscosity 100°F. centistokes	waxes out	204	40.4
210° F. centistokes	12.4	13.5	6.04
Index	...	52	103
Gravity constant	†0.830	0.834	0.806
Molecular weight	521	469	420
Bromine no.	...	0	1.3
Aniline point—°F.	...	232.5	231.1
Wt. % n-Paraffins	6.4	0.2	0.1
R_N	3.3	3.6	2.0
C_P	21	18	20
% C_N	43	48	35
8 C_P	57	52	65

*These values were measured at 80° C. and corrected to 20° C: $d_4^{80} = .8589$, $n_D^{80} = 1.4678$.

†Calculated using viscosity at 210° F. in absence of viscosity at 100° F.

The number of paraffinic chain carbons is calculated using the equation

$$C_p = \frac{(100\text{-}\%\ C_N)}{100}\,(0.071\ \text{Mol. wt.} + 0.1\ R_N)$$

This equation involves no additional assumptions beyond those which are made in determining the % ring. Because of these assumptions, however, the calculated values for C_P can be regarded only as approximations and may be in error by as much as several carbons for tetra and pentacyclic compounds (20).

The molecular weight used in these calculations is derived from viscosities at 100 and 210° F., using the correlation of Hirschler (24).

For the analysis of the aromatic fraction, (Table 3) density, refractive index, specific dispersion, and viscosity are obtained. The number of aromatic rings and the number of naphthene rings per molecule are determined by using a graph developed by Martin and Sankin (25) of this laboratory. The accuracy of this graph has been proved on individual hydrocarbons as well as on petroleum fractions. The % aromatic ring carbons, the % naphthene ring carbons, the number of chain carbons, and the % chain carbons are all derived from the number of aromatic rings, the number of naphthene rings, and the estimated molecular weight.

TABLE 3. DATA ON AROMATIC FRACTIONS¶ SEPARATED BY SILICA GEL

Oil	Relatively Aromatic	Relatively Naphthenic	Relatively Paraffinic
Wt. % of Whole oil	77.5	15.7	14.4
Density, d_4^{20}	1.0124	0.9588	0.9300
Refractive index, n_D^{20}	1.5767	1.5330	1.5180
Refractivity intercept, n-d/2	1.0705	1.0536	1.0530
Specific dispersion*	220.0	145.4	140.2
Viscosity 100° F., centistokes	†23,000	2320	143
210° F., centistokes	67.6	34.2	10.4
Index	−480	−93	38
Gravity constant	0.957	0.886	0.879
Molecular weight	409	435	418
Bromine no.	20	7	14.5
Aniline point, °F.	78	...	130
% Sulfur	0.80	0.33	0.40
Nitrogen	0.239	0.003	0.012
Oxygen‡			
R_A	2.7	1.4	1.3
R_N	1.6	2.5	1.7
C_P	11	14	16
% C_A	42	24	24
C_N	21	32	22
C_P	37	44	54

*Specific dispersion $= \dfrac{n_F^{20} - n_c^{20}}{d_4^{20}} \times 10^4$

†Viscosity at 100° F. extrapolated from viscosities at 140° F. and 210° F. using ASTM chart. The experimental vis. $_{140}$ = 1370 centistokes.

‡Data not yet available.

¶Includes the non-hydrocarbons which are neglected in calculating composition of average aromatic molecule.

Since any non-hydrocarbons which may be present will be adsorbed on the silica gel along with the aromatics, percentages of sulfur, nitrogen, and oxygen are obtained on the aromatic concentrate in order to estimate the percentage of molecules which may contain at least one atom other than carbon and hydrogen.

TABLE 4. COMPOSITION OF OILS

Oil	Relatively Aromatic	Relatively Naphthenic	Relatively Paraffinic
Molecular Type Analysis			
Wt. % aromatic hcs.*	77.5	15.7	14.4
Naphthenic hcs.	21.1	84.1	85.5
n-Paraffinic hcs.	1.4	0.2	0.1
Average Aromatic Molecule			
R_A	2.7	1.4	1.3
R_N	1.6	2.5	1.7
C_P	11	14	16
Average Saturated Molecule			
R_N	3.3	3.6	2.0
C_P	21	18	20
Carbon Type Analysis			
% C_A	33	4	3
C_N (from aromatic molecules)	16	5	3
C_P (from aromatic molecules)	28	7	8
C_N (from saturated molecules)	10	40	30
C_P (from saturated molecules)	13	44	56
Additional Information			
% Extracted by 85% H_2SO_4†	†10.8	negligible	
Max. % sulfur compounds	8.3	0.9	1.0
Nitrogen compounds	6.3	<0.03	0.06

*Includes the non-hydrocarbons, which are neglected in calculating composition of average aromatic molecule.

†The 10.8% of the relatively aromatic oil extracted by 85% H_2SO_4 exceeds the maximum quantity of nitrogen compounds (6.3%) by 4.5%. (17).

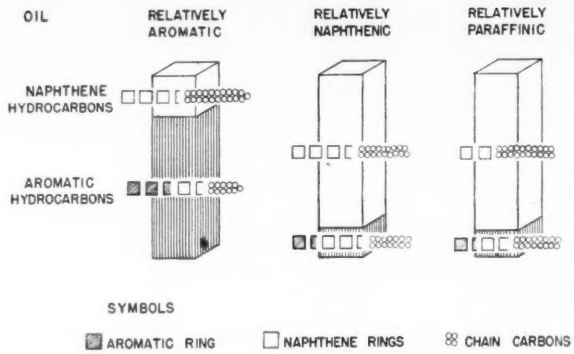

Fig. 4. Graphical Representation of Composition of Processing Oils Based on Molecular Type Analysis

	Relatively Aromatic	Relatively Naphthenic	Relatively Paraffinic
API Gravity	11.8	23.3	30.4
Vis. $_{210}$ Say. Sec.	178	78.5	47
Mol. Wt.	427	464	419

Table 4 gives the analysis of the three oils showing % aromatic hydrocarbons, % naphthene hydrocarbons, and % n-paraffin hydrocarbons. The composition of the average aromatic molecule in terms of aromatic rings, naphthene rings, and paraffin chain carbons is also shown, as well as the composition of the average saturated molecule in terms of naphthene rings and paraffin chain carbons. Since the amount of n-paraffin hydrocarbon is very small, this has been included with the chain carbons associated with naphthene rings. Notice that the relatively naphthenic and relatively paraffinic oils have about the same composition when looked at solely on the basis of per cent. of naphthenic hydrocarbons and per cent. of aromatic hydrocarbons. The relatively naphthenic oil, however, has more naphthene rings in both the saturate fraction and the aromatic fraction.

The average molecules actually show what types of aromatic and naphthenic molecules predominate. For example, the aromatics in the relatively aromatic oil average 2.7 aromatic rings and 1.6 naphthene rings, meaning that a major portion of the aromatic molecules present contain two or three aromatic rings and one or two naphthene rings. However there are probably also minor quantities of aromatic molecules containing one or four aromatic rings, and zero, three, or four naphthene rings. Likewise, the naphthenes in these three oils are predominantly di-, tri-, and tetracyclics, but there are probably minor proportions of mono-, penta-, or hexacyclic naphthenes as well as the small quantities of paraffins (zero naphthene rings) mentioned earlier.

Table 4 also shows the carbon type composition of these three oils in terms of % aromatic carbons, % naphthene ring carbons in the aromatic molecules, % paraffin chain carbons in the aromatic molecules, % naphthene ring carbons in the saturated molecules, and % paraffin chain carbons in the saturated molecules. Note that in this way of looking at it, the biggest difference in the relatively paraffinic and relatively naphthenic oil is in the ratio of the paraffinic to the naphthenic carbons.

These composition data can also be presented graphically, as shown in Figure 4. In this figure the aromatic rings are indicated by cross-hatched squares, the naphthenic rings by plain squares, and the paraffinic carbons by circles. The average molecular structures for the aromatics and naphthenes are shown separately. The symbolic structure avoids the implication that we know how the paraffin chains and the naphthene rings are distributed in the molecule. Our only certain knowledge on how the parts of the molecules are joined together is for the aromatic rings. Where two aromatic rings are in the same molecule, they are practically always condensed to form a naphthalene nucleus; and where there are three aromatic rings, they are mostly condensed together to form the phenanthrene nucleus.

Another type of presentation based on carbon type analysis is given in Figure 5. The upper portion of each bar represents the average composition of the saturates, and the lower portion represents the average composition of the aromatics.

These graphs again emphasize that there are no sharp dividing lines between the various oils. The relatively paraffinic and naphthenic oils both contain about the same amount of aromatic hydrocarbons and differ only in ratio of paraffin side chain to naphthene ring. The aromatic oil, of course, contains much more aromatic hydrocarbons, but still has an appreciable proportion of paraffin side chain and naphthene ring.

At the bottom of Table 4 are shown maximum quantities of sulfur and nitrogen compounds in the three oils, calculated by assuming that there is only one atom other than carbon or hydrogen in the nonhydrocarbon molecule. In the relatively aromatic oil, the 0.21% N (Table 1) is equivalent to a maximum of about 6% nitrogen compounds, and the 0.62% S (Table 1) to a maximum of about 8% sulfur compounds. Data are not yet available for making this calculation on oxygen compounds. There is no indication that such quantities of non-hydrocarbons cause serious interference in the calculation of the average aromatic molecule by our method.

Comparison Sun Oil and n-d-M Methods of Analysis

A method which is very simple to use and which gives ring analysis and carbon type analysis on the whole oils has been developed by Leendertse, Tadema, Smittenberg, Vlugter, Waterman, Van Westen, and Van Nes (3). It has been published by Van Nes and Van Westen in their book (4). This method, called the n-d-M method, uses nomographs relating density, refractive index, and molecular weight to composition for whole lubricating oil fractions without any preliminary silica gel separation. The method is based on correlation of physical properties of cuts from a wide variety of naturally occurring crude oils. The authors point out that these correlations may lead to erroneous results when applied to aromatic

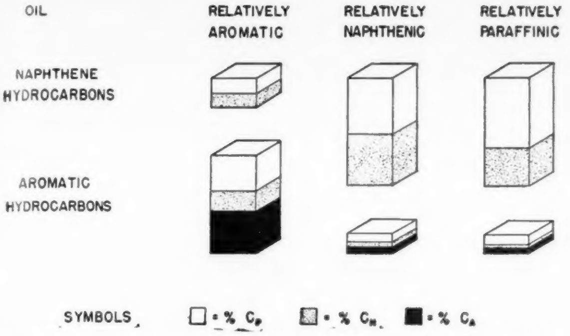

Fig. 5. Graphical Representation of Composition of Processing Oils Based on Carbon Type Analysis

	Relatively Aromatic	Relatively Naphthenic	Relatively Paraffinic
API Gravity	11.8	23.3	30.4
Vis. $_{210}$ Say. Sec.	178	78.5	47
Mol. Wt.	427	464	419

extracts, alkylated aromatics, and samples rich in sulfur, nitrogen, or oxygen.

Table 5 compares the data obtained by the Sun method and the n-d-M method for the three oils considered in this paper. For this comparison the Sun data previously shown for aromatics and naphthenes separately have been summed together to obtain averages for the whole sample. It will be seen that the agreement for these particular samples is quite good. On some extract oils, however, the two methods give quite different results, as shown in Table 6.

The simple n-d-M analysis should be obtained on all rubber processing oils which are being carefully studied. If the value obtained for $\% C_A$ is less than 1.5 times $\% C_N$, and total ring content is less than 75%, the results are probably reliable. These limitations are imposed by the authors (3, 4) and automatically exclude cracked samples and alkylated aromatics, as well as many aromatic extracts. If an oil is particularly interesting in its behavior in rubber, or if it falls outside the limits of applicability of the n-d-M method, then it should certainly be analyzed by the method presented in this paper which gives more complete information on the oil.

If two oils are similar on the basis of our more complete analysis, there is a much greater certainty of their behaving the same in rubber than if their similarity has been established only on the basis of the n-d-M analysis.

Acknowledgment

The authors wish to acknowledge the assistance of many of their associates, in particular M. R. Lipkin and Albert Sankin in the development of the analytical methods; R. W. King in the evaluation of the analytical data; and I. W. Mills and A. B. Hoel in the selection of the oil samples. They also appreciate the helpful discussion which they have had with various members of the staff of The General Tire & Rubber Co.

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TABLE 5. SUN ANALYSIS COMPARED TO n-d-M ANALYSIS

Oil	Relatively Aromatic		Relatively Naphthenic		Relatively Paraffinic	
	Sun	ndM	Sun	ndM	Sun	ndM
R_A	2.2	2.0	0.2	0.3	0.2	0.2
R_N	1.9	2.0	3.4	3.4	1.9	2.0
$\% C_A$	33	36	4	5	3	3
C_N	26	22	45	45	33	33
C_P	41	42	51	50	64	64
Ratio $\% C_A / \% C_N$	1.3	*1.6	0.1	0.1	0.1	0.1

*n-d-M method not recommended when this ratio is above 1.5

TABLE 6. SUN ANALYSIS COMPARED TO n-d-M ANALYSIS ON A SOLVENT EXTRACT FRACTION

	Sun Method	n-d-M	Difference
R_A	1.9	2.1	+0.2
R_N	1.5	0.6	−0.9
$\% C_A$	46	60	+14
C_N	30	5	−25
C_P	24	35	+11
Ratio $\% C_A / \% C_N$	1.5	*12	

*n-d-M method not recommended when this ratio is above 1.5.

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Rubber Industry in Argentina

Argentina's rubber manufacturing industry used between 19,000 and 20,000 metric tons of natural rubber during 1951, including 1,000 tons of latex, in addition to from 1,000 to 1,500 tons of reclaimed rubber. About 1,000 tons of reclaim are produced here annually, but because of its high alkalinity it is apparently used only in the manufacture of hose, heels, battery boxes, and other molded hard rubber articles. Reclaim for use in tires—about 5% is added—is imported from the United States.

Output of tires and tubes increased substantially in 1951, as compared with 1950 production; totals were 940,000 tires and 1,100,000 tubes, and 687,300 tires and 690,000 tubes, respectively; heavy-duty tires and tubes constituted about one third of the whole in each case. Despite this rise, domestic production, especially of large tires and tubes, is still below requirements, and the deficit is imported, chiefly from the United States. At present capacity, the five tire factories operating in Argentina do not appear to be able to produce more than 1,000,000 tires annually without additional plant and new machinery. The government is understood to be considering plans for expansion in the case of at least two concerns, but purchase of plant and equipment is continggent on the availability of dollar exchange. Meanwhile the Argentine Central Bank will authorize the importation during 1952 of up to 100,000 sets of large-size tires and tubes, again if the necessary dollars can be found.

No figures are available for output of other rubber goods, except rubber and rubber-soled footwear, which is said to have exceeded 15,000,000 pairs, against 13,800,000 pairs in 1950.

Growing tightness of credit and high prices in the last quarter of 1951 led to a steep fall in demand for all rubber goods except tires and tubes and production had to be sharply curtailed.

Armed Forces Rubber Testing Symposium

Irving Kahn[1]

RUBBER goods manufacturers who sell to various branches of the Army, Navy, and Air Force have long voiced their displeasure of the necessity of conforming to requirements in current military specifications which call for the use of different low-temperature methods and different apparatus for essentially the same rubber items. Since such a large proportion of rubber goods is presently being manufactured for the Armed Forces and since low-temperature performance is often a prime requisite, a decided need exists of standardization of testing methods and apparatus.

Recognizing this need, Armed Forces engineers responsible for rubber materials met at the Pentagon on March 4 and 5, 1952, to discuss the possibilities for agreement on standard methods and test equipment for use in military procurement specifications of rubber items intended for low-temperature applications.

Low Temperature Tests and Apparatus Chosen

As a result of the above-mentioned meeting, it was agreed that low-temperature rubber tests and apparatus would be divided into four categories as follows:

1. BRITTLENESS. Brittleness is defined as the lowest limit of serviceability as determined by impact.

Test and/or Apparatus. ASTM Method D746, "Method of Test for Brittle Temperature of Plastics and Elastomers (Tentative)," a method using a motor or solenoid actuated mechanism, is recommended.

2. HARDNESS. Hardness is defined as resistance to indentation.

Test and/or Apparatus. Either the Pusey & Jones or the British Admiralty dead load indentor-type tester, as specified in Federal Specification ZZ-R-601, should be used.

3. STIFFNESS. Stiffness is defined as the degree of pliancy or ease of bending.

Test and/or Apparatus. ASTM Method D-1053, "Measuring Low Temperature Stiffening of Rubber and Rubber-Like Materials by the Gehman Torsional Apparatus (Tentative)," is recommended.

4. ELASTIC RECOVERY. Elastic recovery is defined as the force exerted by an elastomer to return to its original dimensions after deformation (an indication of crystallization on extended storage at low temperature).

Test and/or Apparatus. Compression set, temperature-retraction, or tension recovery[2] methods are recommended.

Discussion

Some laboratory work has been completed using the apparatus chosen. Differences in test results have been observed between motor and solenoid actuated types of brittleness apparatus. Apparently these differences are produced by variations in speed of impact. There are some indications that the solenoid type of tester is preferred.

Although both the Pusey & Jones and Admiralty hardness testers are listed, tests indicate that the Pusey & Jones instrument does not operate satisfactorily at —65° F. It is assumed, therefore, that the trend will be toward the use of the Admiralty tester.

The choice of the Gehman apparatus in preference to the Clash Berg for stiffness testing does in no way imply that the Gehman is the better instrument; actually both received an equal performance rating. The choice has been made solely on the basis that the Gehman instrument is more generally available in government and private laboratories.

Significance of These Agreements

The changes in methods and apparatus from those currently specified in military specifications will occur gradually as the specifications are amended or revised. Several years may elapse before the conversion to uniform test methods is accomplished.

As an aid to suppliers who desire to retain their present apparatus, the cognizant Armed Forces activity exercising custodianship over a particular rubber specification will attempt to prepare interpolative charts from the present apparatus to the one agreed upon as a result of this symposium. In cases of disagreement, however, the apparatus and limits specified in the specification will be the primary standard.

The information presented herein is intended to indicate the general trend of thinking of the military with regard to low-temperature tests on rubber and rubber products and should be especially helpful to those Armed Forces suppliers who contemplate the purchase of new low-temperature rubber test apparatus. It is to be emphasized that the agreements reached concern the type of apparatus only and not test procedures such as conditioning times and test temperatures. These latter items vary with the individual Armed Forces branch and its particular end-item or service test requirements. In addition, for the same reason, it is not intended or implied that every military specification for rubber will contain all of the tests and apparatus, or conversely, no other tests than those described herein.

Armed Forces Branches Concurring

The various branches of the Armed Forces who have concurred in these agreements are as follows:

Navy: Bureau of Ships, Bureau of Aeronautics, Bureau of Yards & Docks, Bureau of Supplies & Accounts, and Bureau of Ordnance.

Air Force: Wright Field Air Development Center.

Army: Quartermaster Corps, Chemical Corps, Signal

(Continued on page 507)

[1]Materials engineer, Department of Army, Office, Chief of Ordnance, Washington 25, D. C., and chairman of symposium.

[2]India RUBBER WORLD, May, 1952, pp. 227-28.

Paley Commission Report on Rubber[1]

THE consumption of rubber in the United States can be expected to continue to grow vigorously, possibly doubling over the next 25 years. An even greater rate of increase can be expected in the other free countries, so that the total free world demand for new rubber about 1975 may possibly be around 2½ times 1950 consumption.

The Situation in Brief

The competition of synthetic rubber is expected to bring the long-run world price of natural rubber down to the real cost of producing synthetic rubber—that is, to perhaps 20¢ a pound in terms of 1950 dollars.

The physical basis for a very substantial increase in the production of natural rubber is provided both by the development of a new highly productive tree stock and by the possibility of increasing acreage. However, at the price likely to be set by the competition of synthetic rubber, and with the uncertainties generated both by the security interests of rubber-consuming countries in stimulating their own synthetic production and by the possibility of unsettled political conditions in southeast Asia, natural rubber production is not likely, in the long run, to keep pace with the growth in total demand.

In the near future total supplies of rubber are likely to be ample, but eventually there can be expected a growth of demand that will require construction of new capacity for synthetic rubber production as well as the expansion of natural rubber production.

It appears evident that fundamental market forces, if permitted to operate, would bring about a marked expansion in the production of both natural and synthetic rubber during the next 25 years. To the extent that natural rubber production fails to keep pace with growing world demands for new rubber, and that the price of natural rubber is significantly above the real costs of synthetic rubber, the production of synthetic rubber can appropriately be expanded to make up the difference. This would tend to hold the world rubber price close to the real cost of producing synthetic rubber.

The market forces can operate only indirectly on synthetic production, however, so long as synthetic rubber continues to be produced principally by the United States Government, and this factor must also strongly influence natural rubber producers. Government production of synthetic rubber may operate in two ways to inhibit natural rubber countries from expanding production:

(1) To the extent that it leads to an administratively determined and somewhat lower price for synthetic rubber, it would reduce profit potentials on natural rubber.

(2) It confronts natural rubber producers with the possibility of administrative price actions possibly more severe than normal market conditions would provoke.

In much the same manner, private industry in this country would hesitate to build synthetic rubber plants that might have to meet such competition from government plants.

If, then, synthetic rubber production is to expand adequately and with sufficient rapidity, and without injury to the economies of the natural rubber producing countries, it should be allowed to take place through normal market forces. The synthetic rubber production expansion that would take place under such circumstances would be consistent with national security, provided the appropriate stockpiling policies are also followed. The Commission, therefore, concurs in the declared United States Government policy "that the security interests of the United States can and will best be served by the development within the United States of a free competitive synthetic rubber industry."[2] To this end, it appears desirable that efforts be continued toward an early disposal of government plants and removal of government regulations.

The United States Position

The total actual consumption of rubber in the United States in 1950, after adjusting for inventory changes, amounted to 1,620,000 long tons of new and reclaimed rubber, an all-time peak. Within that total consumption there were about 738,000 long tons of natural rubber, a level exceeded only in 1941; 582,000 long tons of synthetic rubber, making a total of 1,320,000 long tons of new rubber; and 300,000 long tons of reclaimed rubber. The properties of rubber, such as extreme elasticity, impermeability, softness, and electrical nonconductivity, have made it an essential material in a wide variety of uses. Transportation, chiefly pneumatic tires, absorbed about two-thirds of the total rubber consumed in 1950. In non-transportation uses, industrial rubber goods (such as mountings, belting, hose, and fittings), sponge and foam rubber cushionings, heels and soles, wire and cable insulation, and footwear, are the most important uses, in roughly that order.

The tremendous growth in the consumption of rubber may be seen from the comparison with earlier years: in 1900, total rubber consumption amounted only to 20,000 long tons; by 1930 it had risen to 530,000 long tons; by 1940 it was over 800,000 long tons; and by 1950 it had increased to over 1.6 million tons.

During 1950 the United States produced 476,000 long tons of synthetic rubber, less than half its present capacity, and 313,000 long tons of reclaimed rubber; it imported 803,000 long tons net, mostly natural rubber, a level exceeded only in 1940 and 1941. The total supply of both synthetic and natural rubber in 1950—1,592,000 long tons—was slightly less than actual consumption. The difference came from net inventory reductions.

Up to the Second World War, the United States was dependent on outside sources, principally southeast Asia, for its entire new rubber supply. This was all natural rubber. Synthetic rubber production capacity was developed during the war, but much of it was closed down afterward, to be reopened after the invasion of South Korea. Synthetic rubber production amounted to 36% of new rubber consumption in 1950 and 74% in 1951, when much of the imported natural rubber went into the stockpile.

The bulk of this synthetic capacity consists of a general-purpose rubber known as GR-S (Government Rubber—Styrene), a copolymer of butadiene and styrene.

[1] Chapter 20, "Rubber—Natural and Synthetic," from President's Materials Policy Commission Report of June 23, 1952. William S. Paley, chairman of the board, Columbia Broadcasting System, was chairman of the commission.
[2] Public Law 469—80th Congress; extended to June 30, 1952.

Butadiene, which is a gas at normal temperatures and pressure, may be produced from either petroleum or alcohol. Alcohol butadiene costs more because of the higher initial cost of alcohol as compared with petroleum. Styrene is made from benzene and ethylene.

The remaining synthetic capacity is for certain special-purpose rubbers such as butyl from petroleum, neoprene from acetylene gas, and several so-called N-type rubbers which are copolymers of butadiene and acrylonitrile. All GR-S and butyl production facilities are government owned.

During the war domestic synthetic rubber production reached 820,000 tons in 1945, of which over 700,000 tons were GR-S. In 1950 the United States produced 476,000 tons, of which 358,200 tons were GR-S. Total capacities of government and private plants are expected to be about as follows by the middle of 1952:

	Long Tons per Year
GR-S	860,000
Butyl	90,000
Neoprene	70,000
N-type	20,000
Total	1,040,000

United States consumption of rubber, new and reclaimed, may reach 3.3 million long tons by 1975. (See "Projection of 1975 Materials Demand.") This doubling of demand would represent a lower rate of increase than occurred during the preceding 25 years, a period when consumption tripled. The lower rate of increase would result partly from the fact that the number of motor vehicles in operation is not expected to increase in the future as rapidly as in the past. In fact, an even larger part of increased demand in the decades ahead may be associated with non-transportation uses—a category that increased more than fivefold between 1925 and 1950 and may be expected to continue to grow rapidly.

The United States has two main sources of domestic supply to meet its requirement—reclaimed rubber and the war-born synthetic industry.

The growing volume of all rubber in use, and the high possible rate of recovery, provide a very high potential for production of reclaimed rubber. The competitive advantages and supply conditions of natural and synthetic rubber, as to both qualities and prices, have in the past kept reclaimed rubber production below its potential level. Relatively greater reclaimed rubber production may be expected in the future, and it is projected to supply about 800,000 long tons by 1975, compared with 313,000 in 1950.

Production of Synthetic Rubber

Given a projected total demand of 3.3 million long tons by 1975, and reclaimed rubber production of 800,000, new rubber supplies would have to be some 2.5 million tons.

Present domestic synthetic capacity is over one million tons a year. This capacity can be expanded substantially by new-plant construction to keep pace with growing demands. Putting aside, for the moment, considerations of national security and possible future price and supply conditions for natural rubber and synthetic rubber production in other free countries, the basic factors that will affect expansion of synthetic rubber production in this country are the availability of feedstocks (such as butadiene, styrene, and isobutylene) and the quality and performance of synthetic rubber compared with natural rubber.

The supply of feedstocks can be readily increased over the next 25 years with little, if any, rise in real costs. The basic feedstocks absorb only a small part—less than 1%—of the total supplies of petroleum and natural gas likely to be available. Thus, even if United States synthetic rubber production were to reach 2.5 million tons by 1975, a level equal to total domestic needs, the amount of hydrocarbon feedstocks needed would be only about 10 to 15% of total petrochemicals, which in turn probably would constitute less than 5% of total petroleum and natural gas supplies. Of course, additional elaborate and expensive equipment would be required to obtain these feedstocks.

With regard to quality and performance, synthetic rubber is now equal or superior to natural rubber in a large proportion of uses, and its relative performance doubtless will continue to improve. New rubber polymers and, perhaps, new feedstocks may well be produced, while continued advances should be made in the qualities of the presently produced special- and general-purpose synthetics. By 1975, therefore, natural rubber would have superior qualities, and be preferred, in a comparatively small proportion of all uses.

In all likelihood, therefore, insofar as availability of feedstocks and performance qualities are concerned, synthetic rubber production can expand. Any judgment as to the likely rate and volume of expansion must, however, take into account the possible future developments in prices, in the total world demand for rubber and in the supply of natural rubber.

Rubber in Other Free Countries

The 1950 consumption of rubber in other free countries amounted to some 950,000 long tons, of which about 785,000 was natural rubber, 125,000 reclaimed, and 40,000 synthetic. On the supply side, natural rubber production was about 1,855,000 long tons; synthetic, 58,000; and reclaimed about equal to its consumption, 125,000 tons. The excess production of 1.1 million tons, mostly natural rubber, covered net shipments to the United States and countries outside of the free world. Three-quarters of the world's natural rubber output was from Malaya and Indonesia; southeast Asia as a whole accounted for 95%.

In view of the lower levels of rubber consumption in the other free countries, demands in those countries are projected as tripling over the next 25 years while that of the United States may double. Allowing for a roughly corresponding increase in production of reclaimed rubber, the demand for new rubber in the rest of the free world is taken as reaching about 2.5 million long tons by 1975, compared with 825,000 in 1950.

In terms of physical potential alone, natural rubber production could be expanded substantially during the next 25 years. Given stable political conditions in the natural rubber producing countries, particularly in southeast Asia, and a continuing favorable market, it is quite possible that the 1950 rate of production, 1,855,000 long tons, could be doubled by 1975. This goal could be achieved by a feasible rate of replanting with selected stock, which could triple rubber yield per acre. At the present time, yields per acre average 400 to 500 pounds. Improved stocks, which have been developed and used, have yielded as much as 2,000 pounds. Replanting could be supplemented by a sizeable expansion in acres planted to rubber.

Even with future stable political conditions in the natural rubber producing countries, however, conditions in the industry, together with the competitive forces of synthetic rubber and other agricultural products, suggest the greater likelihood that the expansion of natural rubber production may be at a rate which

would bring it to a maximum of 2.5 million tons, at best, by 1975, an increase of roughly one-third over 1950 production.

The average age of the rubber trees throughout Asia is about 30 years, well past the peak yield. During the past few years the unusually high rubber prices stimulated production, a large part of which involved slaughter tapping. But with the anticipated significant decline in natural rubber prices, it will no longer pay to tap many trees now being tapped, and the slaughter tapping to date will mean an accelerated decline in future yields and productive capacity. The rate of replanting and new acreage development would have to be substantial in order to offset this declining productivity. Replanting may be curtailed as competition with synthetic rubber drives down natural rubber prices and makes it difficult for the rubber growers to compete with other agricultural producers for resources, particularly labor, in the producing countries.

Further, while it is useful to attempt an evaluation of the possible future expansion of natural rubber production on the assumption of stable political conditions in the producing countries, account must be taken of the unstable conditions that exist today. Necessary replanting is not going forward currently. Since it takes about seven years for new trees to reach a commercial yield, it seems possible that natural rubber production could be no more than sustained during the next ten years or so and may even decline. Any future expansion may therefore start from a lower level and would have to be correspondingly greater. The likelihood that such an expansion would bring total output about 2.5 million tons appears questionable, although it is undoubtedly physically possible.

Prospects and Problems

It is evident that, with the more than adequate supply of synthetic feedstocks and improvements in synthetic performance qualities that may be expected, the growing demand for new rubber could readily be met by expanding synthetic rubber production. It is, on the other hand, questionable whether the expansion in natural rubber production, subject to the price competition of synthetic, and possibly affected by political conditions in southeast Asia, will keep pace with growing demand.

While national security policies must affect the rate of expansion of domestic synthetic capacity, these policies can also be guided in part by market forces. At the end of 1951 the natural rubber price was about double that of synthetic rubber (around 50¢ a pound compared with 26¢ for GR-S rubber), and the supply of natural rubber was short of total free world demands for new rubber. Whenever the price of natural rubber is significantly higher than the cost of synthetic, including recoverable return on the investment, the incentive to expand synthetic rubber production will be strong. It is to be expected, therefore, that synthetic rubber supplies will continue to be increased over the long run and will competitively bring down the price of natural rubber to the price level of synthetic rubber, which in turn should, in the long run, remain close to synthetic production costs. This situation would, of course, take hold after the next few years during which the world's new rubber supplies may be ample. Supplies currently available have induced a sharp decline in natural rubber prices.

If the synthetic rubber industry is in private hands, this general policy for gearing the rate of construction of new plants to the market prospects should occur on a fairly orderly basis as each producer adjusts to his market possibilities. Until the synthetic rubber industry is in private hands, the governmental policy should follow the same general criterion of gearing synthetic production and the construction of new plants to the prospective demand for rubber at a price close to the cost of producing synthetic, subject, of course, to considerations of national security.

The Cost of Producing Synthetic Rubber

Present experience affords some guidance as to the possible future cost of production of synthetic rubber. With operations at comparatively low levels of capacity, the costs of GR-S and butyl rubber in government plants during 1949 were about 18½¢ per pound. Cost calculations indicate that if the plants had operated at full capacity, the costs per pound might have been as much as 3¢ lower. In spite of some new cost-saving production techniques, however, the government has had to increase its selling prices. In the case of GR-S, the use of higher-cost alcohol feed stocks, required to expand production in the short run, necessitated a price increase from 18½ to 26¢. And increasing costs of production led to a rise in the butyl price, from 18½ to 20¾¢ a pound, in order to avoid a loss.

Since the supply of the petroleum based feedstocks can be expected to increase substantially, the use of alcohol may be regarded as temporary. Further, the increased quantities of feedstocks should be available with little, if any, increase in real costs, so that insofar as feedstocks are concerned, the real cost of about 20¢ may be taken as a long-run cost guide, for both GR-S and butyl rubber, on the basis of government operated plants with present techniques.

The cost experience of private operators may, however, be significantly different, possibly higher. Feedstocks may be more expensive if purchased in the open market instead of being supplied within an integrated system. Similarly, investment, research, sales, tax, insurance, and interest charges may be appreciably different and higher for private operators. Finally, profit allowances would lead to higher prices. In all, taking into consideration the likelihood of marked technological advances which would tend to reduce costs, as well as improve the qualities of the synthetic rubbers, it appears that the long-run cost per pound of GR-S and butyl in private plants may be a few cents more than 20¢ a pound, based on the 1950 general price level.

The future real costs of producing the bulk synthetic rubbers, GR-S and butyl, in this country may then conservatively be placed within striking distance of 20 to 25¢ in 1950 dollars, including a profit margin. And, allowing for special quality differentials, this would be the price range to which the natural rubber price would tend to adjust.

Synthetic Share of New Rubber

It is not possible, nor is it necessary, to evaluate precisely the relative contributions of natural and synthetic rubber to the free world total of new rubber supplies in the future. It does appear likely that synthetic rubber supplies will continue to increase in relative importance and may account for as much as 50 to 60% of the total supply of new rubber around 1975.

Taken together free world demand for new rubber, as projected, would total some five million long tons by 1975. If natural rubber production does expand to what appears to be the most reasonable outside limit of 2.5 million long tons by 1975, and if the total amount is available to the free world, synthetic rubber supply would need to provide 2.5 million long tons by 1975

(50% of new rubber consumption), as compared with slightly over one-half million long tons in 1950 (25%) and less than one million tons in 1951.

In 1950, however, the Soviet Union and satellite countries absorbed about 11% of the world's total consumption of natural rubber. To the extent that their future rubber needs were met out of natural rubber supplies, synthetic rubber would have to meet a larger share of the free world's new rubber demand. If around 1975 the Soviet sphere countries should purchase no more than in 1950, about 200,000 long tons, the share of synthetic rubber in total free world supplies then would be around 55%. It is quite possible that the Soviet countries will buy an increasing amount of natural rubber, so that the share of synthetic rubber in free world consumption may be close to 60%.

It is not possible to estimate just how the expanding synthetic rubber capacity would be distributed as between the United States and other free countries. At present, Canada and western Germany have a combined capacity of less than 100,000 long tons, and the remaining 90% is in the United States. Plans are being carried out or are being explored to introduce synthetic rubber plants in the United Kingdom, France, Italy, the Argentine, and Brazil. On the whole, it is most probable that national security and economic considerations will lead to an appreciable expansion of synthetic rubber capacity outside the United States. Synthetic rubber production may also be expected to increase in Soviet countries.

The foregoing calculations as to the likely magnitudes and composition of consumption that may be expected by 1975, on the basis of the maximum production rate of 2.5 million long tons of natural rubber and the Soviet sphere countries taking no more than in 1950 (200,000 long tons), are summarized and compared with the 1950 data in the following table.

Free World Rubber Consumption, 1950 and Projected 1975

(Thousands of Long Tons)

	United States		Other Free Countries		Total Free World	
	1950	1975	1950	1975	1950	1975
Natural rubber.....	738	*	785	*	1,523	2,300
Synthetic rubber...	582	*	40	*	624	2,700
Total new rubber...	1,320	2,500	825	2,500	2,147	5,000
Reclaimed rubber ..	300	800	125	400	421	1,200
Total consumption .	1,620	3,300	950	2,900	2,568	6,200

*Not separately projected.

Source: 1950 data, U. S. figure from 1951 "Statistical Abstract"; figures for rest of the world from "Rubber Statistical Bulletin," Jan., 1952.

Security Considerations

In view of the United States ability to expand synthetic rubber capacity, no serious security supply problem need be encountered during the next 25 years. If synthetic rubber capacity is expanded at a rate and volume close to the levels projected, a year or two should at any time enable the United States to build up any additional plant capacity needed for a war emergency. The national rubber stockpile, at goal level, would presumably provide supplementary supplies during the build-up period. The stockpile goal can, of course, be adjusted to changes in the relative dependence on imports and to changes in the degree of substitutability as between natural and synthetic rubbers. Further, the stockpile goal would be affected by the extent to which natural rubber production is successfully fostered in Central and South America and in Africa.

Should natural rubber production fail to expand significantly, the United States and other free countries should increase synthetic rubber production at a correspondingly greater rate and thus be closer to the plant capacity levels that might be required in a war emergency.

More Rubber Needed in Brazil

RUBBER production for the first quarter of 1952 reached 11,914 tons, against 9,616 tons a year earlier. These are gross weights, and no allowance has been made for moisture content, which is apt to be high, especially in the lower grades.

For some time now the country's output of natural rubber has been proving insufficient to meet the growing demand of the expanding local rubber goods manufacturing industry, especially of the tire branch. The increasing use of motor vehicles is creating an ever-rising demand for tires which manufacturers are trying to meet by enlarging their factories, or building additional facilities. However the problem of adequate supplies of raw rubber still remains. From time to time the desirability of establishing a synthetic rubber industry here is mooted, and reports go so far as to name Union Carbide & Carbon Corp., a European group, and the Brazilian Sugar Institute, respectively, as possible manufacturers of Buna S. The first two, it is implied, would operate in association with Brazilian interests.

Meanwhile the government is taking positive steps to stimulate production of natural rubber. Prices were recently raised, and at the end of March, 1952, the President signed a decree requiring rubber goods manufacturers to invest 20% of their annual net profits in the development of rubber plantations. According to the decree, effective April 15, 1953 (one year after date of publication), distribution to rubber goods manufacturers of import licenses, foreign currency for imports, and quotas of domestic and imported rubber, will be conditional on their furnishing proof that they have either established their own plantations, participated in the capital of specialized companies, or taken securities or entered special contracts with persons engaged in planting rubber in suitable areas, as determined by the Minister of Agriculture. The latter will provide the necessary technical assistance and is also planning a colonization program, particularly in the Amazon area, with a view to rapid expansion of rubber cultivation.

It is also announced that 62 new nurseries, with annual capacity of more than 1,800,000 rubber trees, are being completed at several points in the Amazon Valley, under sponsorship of the Northern Agronomic Institute and the Amazon Credit Bank.

A good amount of rubber could probably be obtained from the former Ford plantations at Belterra, if an adequate labor supply were available. Of the 2,500,000 existing *Hevea* trees, 1,100,000 are said to be ready for tapping, but so far only a negligible number have been tapped because of the shortage of labor.

Some Butyl Inner Tube Problems[1]

A. N. Iknayan[2]

BUTYL rubber (GR-I) exhibits some unusual characteristics which have required considerable study in connection with its use in inner tube production in industry. This study has led to adjustment of manufacturing methods to obtain levels of efficiency and quality necessary for large-scale commercial use. The excellent heat and age resistance, high resistance to gas permeation, and good tear resistance of butyl rubber have contributed to improving the fundamental adequacy of pneumatic inner tubes so that butyl has almost completely displaced natural rubber for that purpose. These highly desirable properties of butyl rubber, coupled with relatively low cost, have justified the early decision to convert to the new synthetic rubber without ready practical solutions for many factory problems immediately created.

Cold Buckling

Experience with the first butyl rubber tubes showed only one major deficiency which results from a tendency of the rubber to stiffen at temperatures of +10° F. and lower. Under circumstances of low inflation pressure and operation in the cold, butyl tube walls lost sufficient elasticity to stretch and recover during the deflection cycle of the tire casing. Inability to accommodate itself completely to casing movements caused progressive formation of wrinkles in the tube, which, if extensive enough, rubbed together within the air cavity, causing failure of the tube.

This problem is fairly well solved by the use of rather large proportions of mineral oil, high-temperature cures, and judicious choice of blacks in tube compounds. These compounding changes made it expedient to depart from the original GR-I to newer polymers of higher viscosity and cured modulus, i.e., GR-I-17 and GR-I-18. Today it is customary to use as much as 25 parts of mineral oil for 100 parts of polymer, and curing temperatures as high as 360° F.

Uncured Compound Strength

Probably the greater part of inner tube processing problems results from the thermoplastic and elastic behavior of uncured butyl at ordinary handling temperatures. These effects are only slightly changed by compounding since the choice of ingredients is strictly limited by quality considerations.

Within the normal range of factory room temperatures, uncured butyl stocks appear nervy. Over a period of time, however, the same stocks exhibit excessive plastic flow. The elastic component of behavior seems to change rather abruptly in the vicinity of 85° F., and the raw strength of the material declines rapidly with increasing temperature, especially if the stock sustains reorienting strain (become disoriented) from squeezing, folding, and the like. This peculiarity of behavior is not so pronounced in usual natural rubber inner tube compounds since they retain considerable uncured tenacity at normal factory temperatures. Generally speaking, uncured butyl compounds, as compared with natural rubber compounds, do not exhibit much tendency to "strain harden" with deformation, but relax rapidly under any manipulation that requires stretching or clamping. While this property greatly benefits both mixing and extrusion, conventional methods of splicing and forming extruded tubes before molding become more difficult.

Some relief from these conditions has come from the general shift from GR-I to higher Mooney GR-I-17 and GR-I-18 polymers. Another way to improve the raw tenacity of butyl compounds is to introduce a minor degree of scorch during the early stages of mixing. This is usually done by small additions of very active cross-linking materials, such as p-di nitroso benzene (Polyac). The added nerve of such compounds is sometimes helpful during the summer to prevent serious weakening of creases during the inflated forming process. Use of the reinforcing grades of black tend to give improvement. The basic properties of Butyl tube compounds, however, can be modified in this direction only to a moderate extent without loss of either cured quality or uncured uniformity. The limited ability to increase the handling quality of butyl stocks by compounding alone has required some changes in tube manufacturing methods.

Tube Shaping Developments

Since 1930, inner tubes have been extruded as a straight continuous thin walled cylinder which is cut into tube lengths, and the ends joined (spliced) to form a hollow band. The air valve may be applied to the tube either before or after splicing, depending on the methods developed for the specific building unit. Since tubes are cured by inflation in steam-jacketed clamshell molds, the raw band must be shaped to approximately the size of the mold before it is vulcanized. If the shaped tube does not relax before it is placed into the hot mold cavity, serious thinning will result at those points where it first contacts the hot mold surface.

Shaping before cure has always been critical since shaping involves considerable stretching of the uncured flat band as it is inflated. Shaping also requires subsequent relaxation for satisfactory mold loading. For example: a flat band uncured tube, 54 inches in circumference and 6½ inches in width, may be inflated to an inner tube shape which is 51 inches in inside circumference with a round cross-section of five inches diameter, i.e., the outer circumference is expanded from 54 inches to 82.4 inches, and the cross-section circumference from 13 inches to 15.7 inches. As the uncured band is inflated, considerable stress is applied not only to the splice, but also to the longitudinal creases. The weakness caused by creasing in addition to weakness at the splice due to poorer joining ability of butyl has been a serious obstacle in the shaping operation. These weaknesses may be overcome by reducing the amount of expansion tension necessary to obtain final molding shape.

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[1]Based in part on a paper presented before the Washington Rubber Group, Jan. 16, 1952.

[2]Assistant director—tire development, United States Rubber Co., Detroit, Mich.

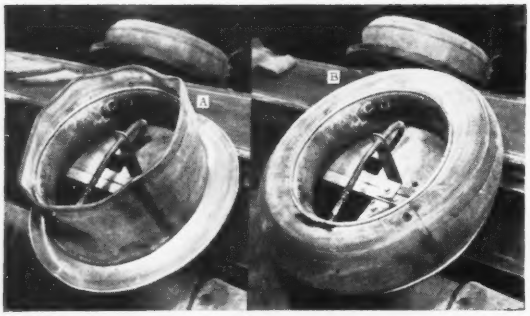

Fig. 1. (A) Flat Bond Tube before Inflation; (B) Flat Band Tube after Inflation and Ready for Molding

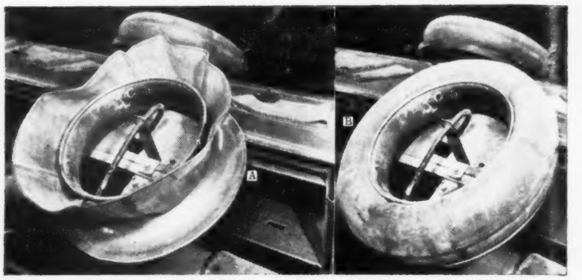

Fig. 2. Tube Shaping: (A) Helical Tube before Inflation; (B) Helical Tube after Inflation and Ready for Molding (Note Circumferential Rib Still Evident Indicating Minimum of Stretch in Tube)

A reduction in expansion tension has been accomplished by departing from the practice of extruding inner tubes in straight form. This newer process consists of pulling the tube during extrusion, faster from one side of the die than from the opposite side so that it emerges from the extruder in a helical shape. The helical shaped tube is transported continuously in a drape over conical rolls through water sprays and soapstone application to a cutting device which delivers the raw, shaped tube sections. Depending on the helical diameter, the width and the length, it is possible to produce uncured inner tubes after splicing and valving which may be inflated to mold shape and size with little or no stretching. Dimensions may vary on account of immediate requirements of the department layout. The excellent extrusion characteristics of butyl readily adapt it to this innovation and have been quite successful in reducing a most difficult part of tube making. See Figures 1 and 2.

Splicing Problems

While uncured butyl tube stocks are superficially quite tacky, uncured bonds are weak owing to the lack of strength of the material itself. This effect is especially important in the problem of butt splicing of tubes and the application of valves to the uncured tube.

Momentary pressure applications commonly used for joining uncured natural rubber stocks are usually insufficient for butyl. For instance, ordinary stitching or rolling does not produce laps or seams good enough to allow safe handling of assemblies. Application of sustained pressures for appreciable periods of time has seemed to be necessary for most assembly operations in tube making. This tends to cause creasing and "bruising" of the raw tube, and these weakening effects must be compensated or avoided. Equipment used for these operations has necessarily had to be precisely time cycled and pressure controlled to obtain the desired adhesion with the least distortion. To a certain extent, butyl stock which has been "bruised" by clamping and squeezing operations will recover strength after some hours of rest, but this procedure is somewhat unpredictable as well as inconvenient. In the case of machine butt splicing, it has been found useful to stiffen the squeezed areas and the splice by chilling just before shaping. Liability of excessive thin out due to stock weakness may be avoided by this means.

Probably the most emphasized and difficult step in tube making is that of joining the two ends of the extruded section to form an endless tube. This is usually called "splicing." Several types of equipment have been devised for making tube butt splices under mechanically controlled conditions. Most of these depend on making a clean vertical cut with a hot knife through the ends of the raw tube and bringing the two freshly exposed surfaces together with sufficient pressure to "knit" them firmly together. It is necessary to contain the tube ends under some pressure in clamping devices so disposed as to allow accuracy of cutting and subsequent joining motions. Pressures applied to the tube through the various machine operations are controlled both as to extent and time. The general adoption of butyl has required some changes in automatic butt splicing machines, principally in the direction of improving the quality of the cut, which is dependent both on the amount and uniformity of clamp pressure and the degree of relaxation of the tube when it is severed. Correct knife temperatures, shearing angles, and speed control have been revised. Butyl requires better matching of the two tube ends to avoid excessive "flash" as the clamped ends are brought together under high pressure. Cutting irregularities result in spotty splice quality since points of excess material interfere with proper joining of points where minimum material is available. Longer clamping pressure intervals are ordinarily favorable to better cutting and joining. Butyl stocks, however, sustain severe bruising and creasing under these circumstances, and it was necessary to find some means of lessening dwell times. Studies of the cutting problem revealed some methods and knife variations which make it possible to obtain improved cutting accuracy in respect to both straightness across the tube and perpendicularity. With more precise cutting equipment, longer pressure times to overcome irregularities are unnecesary. See Figure 3.

Valve Application

Another problem of adaptation for butyl has been the application of air valves to uncured tubes. Prior to the use of butyl, it was common practice to apply the buffed and cemented valves directly to the tube wall with pressure devices or by hand-stitching, neither of which required much in the way of accurate control. Butyl valves must be applied with sustained pressures, as long as four or five seconds. These intervals, of course, will be dependent on the exact nature and condition of the tube stock, the type of butyl cement used, temperature, etc.

Hand-stitching has been almost useless for straight-line production set-ups. It has been necessary to build or modify equipment so that split-second timing and careful control of pressures can be maintained in this operation. Bruising of tubes as a result of valve application is not quite so serious a matter as in splicing. Nevertheless stock weakness and resultant thinning should be avoided by careful design of equipment and strict machine control. Maximum operating limits involving time and pressure applied to the raw tube have had to be

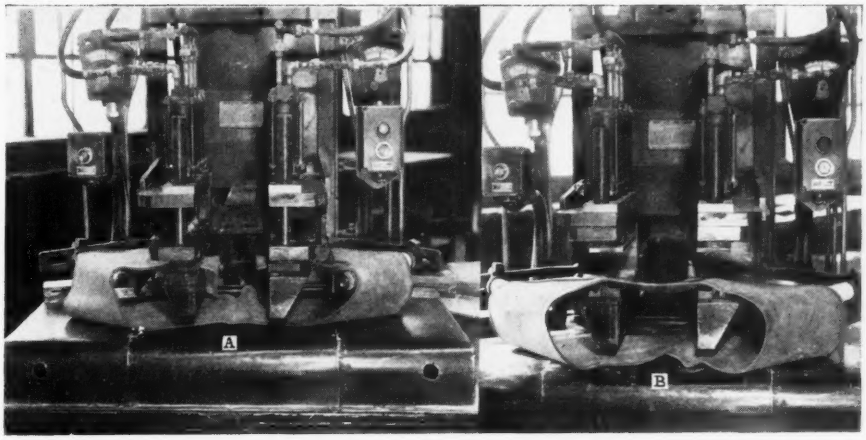

Fig. 3. Inner Tube Machine Butt Splicing; (A) Hot Knife Cutting; (B) Finished Splice at End of Machine Operation

derived from critical studies of the compounds themselves.

Compound Segregation

The most serious initial manufacturing problem arising from the use of butyl has been that of segregating butyl from all other polymers that may be used in the same mill room and manufacturing departments. Butyl compounds in proportions as low as 1% are serious contaminators for natural rubber, GR-S, and nitrile type rubbers. Results of contamination are cure rate irregularities, blown and blistered cures, and tubes with low physical properties. There are no well-known means of recovering butyl stocks contaminated with the non-compatible rubbers or the several mentioned rubbers contaminated with butyl. Several years' production experience has resulted in segregation of compounds by the use of such devices as colored stripes, colored liners, well-identified scrap containers, etc. Segregation of mixing equipment for the use of butyl is required. Such equipment, if it must be used for non-butyl stocks, must be cleaned by the use of clean-up batches which are eventually discarded. Production change-over from butyl to another type of rubber should be planned and scheduled with clean-up operations and reliable inspection. The effects of contamination are readily detected, and employes can be effectively shown the consequences of mixing butyl stocks with other stocks.

Summary and Conclusion

It is generally believed that the advantages of butyl rubber in inner tubes are well established after eight years of production. These eight years have produced progressive changes in tube manufacturing. This article is intended to discuss a few examples of the process and equipment practice which have helped to make possible the use of a new polymer in large-scale production of inner tubes. The writer has made no attempt to discuss all of the excellent accomplishments by the inner tube industry and their suppliers.

Australian Rubber Business Off

Australian output of rubber goods in 1951 is estimated to have included 1,640,000 automobile and motor cycle tires, 657,000 heavy-duty tires, 2,700 airplane tires, 1,925,000 inner tubes, 750,000 fan belts, 125,000 refrigerator belts, 550,000 multi-V-belts, 2,000,000 feet of flat transmission belting, 500,000 feet of conveyor and elevator belting, 10,000,000 feet of hose, and 10,000,000 pounds of retreading materials.

Local demand for tires, belting, hose, and camelback remained high during 1951, but sales of other goods tapered off. The effects of a slackening of business activity in other fields are being felt also in the rubber industry, and it is doubtful whether expansion programs will be carried out at the rate originally planned.

In March, 1952, reductions in imports of various kinds of goods were announced and included cuts of up to 80% in imports of motor vehicles; hard rubber sheets, compounded rubber and rubber latex, also tires, other than pneumatic, are cut to 40%; and imports of various kinds of rubber footwear, rubber syringes, and other rubber manufactures, to only 20% of the 1950/1951 value will be permitted to enter. Rubber printing blankets, crude waste, powdered and reclaimed rubber, and pneumatic tires and tubes will be dealt with on their individual merits.

Testing Symposium

(*Continued from page* 500)

Corps, Ordnance Corps, and Engineer Corps.

Plans for Future Action

It was decided that a similar symposium would be held annually to implement the decisions of this meeting and to attempt to reach agreements relevant to other rubber test apparatus and conditioning equipment. For purposes of future agenda, informal suggestions from interested activities are solicited.

Editorials

Rubber — Political *versus* Economic Factors

RECENT events, the sharp decline in the price of natural rubber, the possibility that the GR-S price may be further reduced, and the decision of the consuming industry in the United States to insist on stricter adherence to natural rubber quality and packing specifications, have resulted in increasing emphasis by natural rubber producer interests on political considerations in an attempt to reverse the price trend for that rubber and regain a greater share of the market.

In June, Gen. Sir Gerald Templer, British High Commissioner for Malaya, called on the United States to take steps to halt the drop in the price of natural rubber in the world market in order to prevent a possible collapse of economic stability in Malaya and grave weakening of resistance to Communist terrorism.

Natural Rubber News, publication of the Natural Rubber Bureau in Washington, D. C., and supported by the rubber growers of southeast Asia, in its June issue states:

"The plunging price for natural rubber has now become a matter of genuine concern not only for the producing industry and the Governments of the producing countries, but for all responsible statesmen in allied countries who are dealing with the problem of keeping Southeast Asia on the right side of the bamboo curtain."

In connection with the concern that the price of synthetic rubber will be reduced again as high-cost alcohol production of GR-S is curtailed, *Natural Rubber News* tries to reassure the rubber growers when it says:

"The producing areas should know that the majority sentiment of the United States Government at the present time is against further price reduction, and they should know that the whole subject of synthetic rubber pricing is being seriously reconsidered by the affected Government agencies in the United States."

Although the United States Government is undoubtedly sympathetic to the problems of the rubber producers in southeast Asia, there is reason to doubt that "majority sentiment . . ." will always be against further price reductions.

According to Harry A. McDonald, Reconstruction Finance Corp. Administrator, speaking at a press conference in Washington on June 16, whether RFC would abide by its present policy and make a corresponding reduction in its selling price of GR-S with the closing down of two high-cost alcohol butadiene units is still to be determined. He added that the State Department had asked him to consider the impact of future price action on the domestic economies of natural rubber producing countries and keep the State Department informed of any prospective moves. State Department officials confirmed this fact, but added they had gone no further and intended to leave the decision up to RFC.

Mr. MacDonald also indicated that the ultimate decision may hinge on considerations other than the possible unfavorable impact on natural rubber prices. He said that declining volume of RFC's rubber sales must be considered in determining the selling price of GR-S. Even though RFC is making a profit at the present time and volume, this profit might disappear if natural rubber won a larger part of the market, forcing greater reductions in GR-S output. RFC announced on June 27, however, that the price of GR-S will remain at 23¢ a pound for the present.

The report of the President's Materials Policy Commission headed by William A. Paley, chairman of the Columbia Broadcasting System, which was made public on June 23, prophesies that the competition of synthetic rubber is expected to bring the long-run world price of natural rubber down to the real cost of producing synthetic rubber, that is, to perhaps 20¢ a pound in terms of 1950 dollars.

Some further sobering facts for natural rubber producers are found in the report, as follows:

"The average age of rubber trees throughout Asia is about 30 years, well past peak yield. During the past few years, the unusually high rubber prices stimulated production . . . but with the anticipated significant decline in natural rubber prices, it will not longer pay to tap many trees now being tapped. . . . The rate of replanting would have to be substantial to offset this declining productivity. Necessary replanting is not going forward currently.

"It seems possible that natural rubber production could be no more than sustained during the next 10 years or so and may even decline."

The Rubber Manufacturers Association, Inc., is initiating a program which it says is "designed to assist rubber goods manufacturers to get what they pay for in buying natural rubber.

"Rubber of a fraction to a full grade off quality is delivered as something better than it is. . . . Far Eastern grading and packing of natural rubber has been one of the industry's most serious problems since World War II. The committee is convinced that there will be no improvement until the industry insists on getting what it pays for by tightening up its buying and inspection procedures."

There is a strong indication that as far as the United States is concerned, economic rather than political factors will have the greatest bearing on how much natural rubber will be used in the future in this country—and at what price.

R. G. Seaman

Blow Extrusion of Vinyl Film[1]

Albert M. Stover[2]

A BRIEF review of some data will emphasize the possibilities offered by this new industrial development. In the year 1950 more than 100,000,000 pounds of calendered vinyl film were produced and consumed in this country, as compared with about 27,000,000 pounds in 1947. It is almost impossible to visualize the potential increase in the film market if the price per square yard of film could be reduced to one-half or one-quarter the present price.

As the consumption of film increased, the industry trend was constantly toward the manufacture and sale of the thinnest possible gages obtainable on calenders. Although most calenders today cannot produce film below 3.5 mils in thickness because of equipment limitations, there are some calenders producing film commercially as low as 1.7 mils. The price per square yard of film, which is tied in with the price per pound of compound, thus has reached a bottom limit for most of the operators of calenders.

In this paper a process will be described whereby vinyl film can be produced in any desired thickness ranging from 20 mils on down to one mil (0.001-inch), or even as thin as 0.3 mil. Continuous film more than 100 inches in width can easily be obtained. The greatest potential for this process seems to lie in film in the range of three mils and below. Although the pound cost of the thin gage film may well be as high or higher than that of film made by other processes, the cost per square yard should be lower in approximate proportions to the reduction in thickness.

Compound Preparation

Polyethylene has been extruded successfully for some years by the process of blow extrusion. Initial attempts to manufacture vinyl film commercially by this process failed because of a combination of three reasons, inadequate equipment, unsuitable compounds, and, most particularly, lack of technique. Members of our staff became enthusiastic about the possibilities of vinyl film blow extrusion some time ago and embarked on a program to determine the technical and economic feasibilities of the process.

It is necessary to develop very high tear strength in the film to enable it to be used in very thin gages. Extremely high processing temperatures are necessary to develop maximum tear strength. As a first requirement, therefore, a resin of very high heat stability is needed. The second requirement is that the resin extrude smoothly and without nerve. Thirdly, a high extrusion rate is extremely desirable to obtain the highest possible production output in pounds per hour.

In Marvinol VR-10 we were fortunate in having a resin uniquely suitable for this process since it is widely recognized as meeting all three major requirements given above. Firstly, it has excellent heat stability, partly owing to the fact that it is the highest molecular weight general-purpose vinyl chloride resin now being used in this country. Secondly, calendered sheets or extrusions based on Marvinol VR-10 are remarkably free from the waviness or roughness usually associated with nervy stocks. During processing, these Marvinol compounds are extremely flat and nerveless. Thirdly, the higher output in pounds per hour obtainable from extruders, when Marvinol VR-10 is used as the vinyl resin, has been reported repeatedly by the trade over the last few years.

In our initial work on this project we found it advisable to use highly stabilized, overlubricated vinyl compounds until we had worked out the necessary operating techniques. Suggested formulations for preliminary experimental work are given in Table 1.

TABLE 1. SUGGESTED FORMULATIONS FOR EXPERIMENTAL WORK

Formulation 191-126	Parts	Formulation 196-5	Parts
Marvinol VR-10	100.0	Marvinol VR-10	100.0
Dioctyl phthalate	35.0	Dioctyl phthalate	30.0
Dyphos stabilizer	2.0	Dibutyl tin maleate	2.0
Tribase stabilizer	4.0	Calcium stearate	1.0
DS-207	0.5	Acrawax C	2.0
Acrawax C	0.5	Mineral oil	2.0
Carnauba wax	2.0		
Titanox RA-NC	12.0		

It is obvious that the plasticizer content of a compound used for very thin film is considerably lower than that used for the heavier four-gage film, which is usually about 45 parts per 100 parts of resin. These experimental formulations will not yield entirely satisfactory film because of a waxy or greasy feel, but they are recommended for determining operating conditions and developing the necessary operator technique. A general-purpose film formulation having a better appearance is given in Table 2.

TABLE 2. GENERAL-PURPOSE FILM FORMULATION

	Parts
Marvinol VR-10	100.0
Dioctyl phthalate	30.0
Dibutyl tin maleate	1.0
Advance stabilizer #3	0.5
Calcium stearate	0.3
Carnauba wax	1.0

[1]Based on a paper presented before the National Technical Conference, Society of Plastics Engineers, Inc., Chicago, Ill., Jan. 18, 1952.
[2]Manager of vinyl development, Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn.

Extrusion Equipment and Procedure

Basic machinery for the manufacture of film by blow extrusion consists of the following:

(1) Premixing equipment for preparation of feed to the extruder.

(2) An extruder equipped with a film blowing head.

(3) Take-up equipment for rolling up the film.

(4) Least expensive, but not least important, "die dismantling" equipment.

This fourth item is most necessary for development work, since experimental compounds do not always behave as expected. As is known, polyvinyl chloride compounds, like most organic materials, will decompose if excessive heat is applied for too long a period of time. The degradation of the vinyl can become autocatalytic and can release large quantities of hydrochloric acid gas. The carbonaceous residue tends to adhere very tightly to the acid etched metal of the die; so it is best to avoid this situation. We found it necessary to devise a means of getting the film blowing die apart very quickly when trouble occurred or when a successful run was terminated.

In our first attempts we made a table small enough to place under the die and put an automobile jack on this table. We then tried to force the core pin out of the die with the hydraulic pressure exerted by the jack, but found that the adhesion of the compound to the die and core pin was such that the jack simply raised the extruder off the floor. We overcame this difficulty by the use of a ⅜-inch thick annular steel ring with diametrically opposed slotted ears. This ring is placed on top of the die around the rim, but clearing the core pin, and is attached by chains from the ears to the table holding the jack. The jack is used to force a cylindrical steel tube against the bottom of the mandrel or core pin to push it out of the die. After a little experience, it was found that this method enabled us to get the die assembly apart in a matter of minutes instead of hours.

At the start of the extrusion operation the tube is pinched off, and the extruded section inflated very slightly with air. The end is then passed through two squeeze rolls, as shown in Figure 1, which effectively seal the upper end of the tube. At this point additional air is introduced through the die, and the tube expanded to the size shown in Figure 2. This expansion must be carried out very slowly, or a tube with a very uneven diameter will result. The air is sealed in between the nip rolls at the top and the die at the bottom. When the desired degree of expansion has been reached, the air supply is shut off and continuous film production can begin.

To change the gage of the extruded film it is merely necessary to vary the speed of the take-up rolls. If, for example, the arrangement is such that four-mil film is being produced with a given set of conditions, it is possible to change very quickly to two-mil film merely by doubling the speed of the take-up rolls, thus drawing the material away from the die at twice the original rate and causing it to thin down to half the original thickness. To change to one-mil film from two-mil, it is only necessary to double the take-up speed again. Further decreases in film thickness can be accomplished by corresponding increases in the take-up speed.

When starting up operations, we find it advisable to run with a large amount of bleed stock to prevent initial hang-up in the die. Once the stock is flowing freely through the extruder, the bleed can be cut back to a minimum. A small amount of bleed helps prevent stagnation in the head. We usually find it advisable to start with a die temperature some 20-30° F. below that of

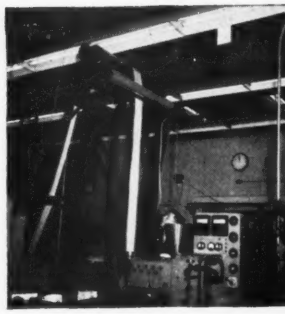

Fig. 1. At Start of Extrusion Operation, Leading End of Tube Is Passed through Squeeze Rolls Which Provide an Air Seal

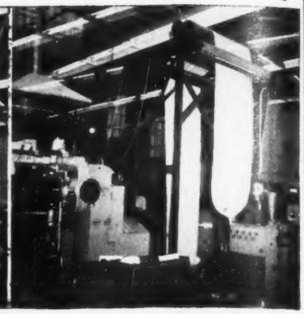

Fig. 2. Air Is Blown into the Tube through the Die to Provide for Desired Tube Expansion during Production Run

standard operating conditions. Once the tube has formed, operating the extruder near its maximum speed seems to improve the flow characteristics of the compound and helps prevent stock stagnation.

The following set of conditions was found suitable for the operation of our 1½-inch Modern Plastics Machinery Corp. extruder equipped with a four-inch diameter die film head:

TABLE 3. EXTRUSION CONDITIONS

	Start of Run	Main Part of Run
Die temperature, °F.:		
Core pin	335-350	395-425
Die face	335-350	395-425
Head temperature, °F.	350-360	380-400
Barrel temperatures, °F.:		
First section	350-360	350-360
Second section	320	320
Screw speed, rpm	40	40
Temperature	Not checked*	Not checked*
Hopper temperature	Not checked*	Not checked*

*Ambient temperature; neither steam nor water used.

In Table 4 the costs of three different sizes of extruders are shown, together with the costs of the corresponding tubular die film heads.

TABLE 4. EXTRUSION EQUIPMENT COSTS

Extruder		Tubular Die		
Screw Diameter, In.	Cost	Diameter, In.	Cost	Total Cost
1½	$ 4,200	4	$1,060	$5,260
2½	8,500	8	1,475	9,975
3½	11,400	8	1,525	12,925
		14	3,165	14,565

While it is possible to make any thickness of film on any one of the different extruder sizes shown, it is easier to make larger diameter tubes with the larger die sizes.

Extruded Film Properties

Physical test data on film samples prepared in our laboratory are shown in Table 5. The extruded two-mil film was prepared at 420° F.; while the calendered film was made at 320° F. It will be noted that the higher processing temperature has contributed to the better physical properties of the extruded film. The higher tear strength is particularly outstanding.

TABLE 5. COMPARATIVE PHYSICAL PROPERTIES OF LABORATORY CALENDERED AND EXTRUDED TWO-MIL FILM (FORMULA BASED ON 100 PARTS RESIN AND 45 PARTS DOP)

	Extruded	Calendered
Processing temperature, °F	420	320
Tensile strength, psi	2,600	2,000
Elongation, %	170	120
Modulus at 100% elongation, psi	1,800	1,800
Elmendorf tear strength, psi.:		
With grain	910	170
Across grain	980	360

Films containing a 45-part plasticizer formulation tend to be too soft when made as thin as two mils, and a lower

plasticizer ratio is preferable for many applications. In Table 6 the effect of lowering the plasticizer content from 45 parts of DOP to 30 parts per 100 parts of resin is shown.

TABLE 6. EFFECT ON FILM PROPERTIES OF REDUCED PLASTICIZER CONTENT

	45 Parts DOP	30 Parts DOP
Tensile strength, psi	2,600	4,600
Elongation, %	170	220
Modulus at 100% elongation, psi	1,800	3,100
Elmendorf tear strength, psi.:		
With grain	910	340
Across grain	980	670

Reducing the plasticizer content gives a decided increase in tensile strength and 100% modulus, but decreases the Elmendorf tear strength.

Applications of Extruded Film

One very obvious end-use for extruded very thin vinyl film is industrial packaging of all kinds, since the film acts as a barrier against water, grease, and dust. There are also many non-industrial applications for the film. The writer believes that the largest volume of sales will eventually be in the form of rolls of tubular film sold directly to individuals for use in the home, just as waxed paper and aluminum foil are now sold. Film of this type should find universal acceptance in the household for many uses, since it is possible to make them very soft and flexible or stiff and paper-like by varying the amount of platsicizer. These films, of course, can be made in many different attractive colors.

The extruded film is also good for the storage of clothes in all seasons in dustproof and mothproof containers. It can be used to protect rugs and furniture during interior painting operations. The film makes very effective and low-cost storm windows because it can be made with excellent clarity and adhered to window frames with pressure-sensitive tape. Protection of white clothes and other wearing apparel during traveling is another application for the film.

The film should also find application as a waterproof and greaseproof material in the kitchen, for example, as a disposable liner for garbage pails. An inside lining of the plastic film converts any cardboard or wood box, or even paper bag, into a watertight container. A watertight plastic bag can be made by the simple process of tying a knot in one end of a length of tubular film.

The film should find many applications outside the home. Outdoors, large sections of film might be effective in keeping birds from includlng freshly planted grass seed in their diet, and such film should protect flowers and vegetables from unexpected frosts.

Possible uses for the thin film are almost endless. The fact that the film can now be made thinner than ever before, yet be serviceable, will enable it to be sold at a price attractive to the modern housewife who can compare the advantages of the film with those of cellophane, wax paper, aluminum foil, thin fabrics, and other materials of similar gage.

Summary and Conclusions

The physical properties of thin-gage extruded vinyl film appear to be fully as good as those of film prepared by other methods. Blow extrusion offers a real cost advantage in that it permits manufacture of film at a relatively low capital investment. In conclusion, it can be said that many of our customers agree with us that there is a large potential market for extruded film and have installed suitable manufacturing equipment now that they know it can be produced.

Brown Reelected SPI Head

GORDON BROWN, Bakelite Co., was reelected president of The Society of the Plastics Industry, Inc., for the year 1952-1953 at the Society's annual business meeting on May 28 at the Commodore Hotel, New York, N. Y. Horace Gooch, Jr., Worcester Moulded Plastics Co., was reelected chairman of the board. J. E. Gould Detroit Macoid Corp. and previously SPI secretary-treasurer, was elected vice president; and John J. O'Connel, Consolidated Molded Products Corp., was elected secretary-treasurer.

In addition to the four officers, the following diirectors were elected for the coming year: Canadian Section, Howard Yates, Crystal Glass & Plastics, Ltd.; Midwest Section, Earl R. Keown, Santay Corp.; New England Section, George V. Sammet, Jr., Northern Industrial Chemical Co.; and Pacific Coast Section, Lee T. Bordner, Sierra Electric & Mfg. Co. Directors representing the various divisions of the industry are as follows: button, Thayer Baldwin, Patent Button Co.; engineering and technical, N. J. Rakas, National Automotive Fibres Inc.; film and sheeting, John Bolten, Jr., Bolta Co.; reinforced plastics, Harold B. Freeman, American Cyanamid Co.; and machinery, John C. Cotner, Hydraulic Press Mfg. Co.

SPI directors at large include G. G. Welch, Watertown Mfg. Co.; Henry E. Griffith, Plax Corp.; J. R. Hoover, B. F. Goodrich Chemical Co.; Joseph A. Jackovics, Rel Plastics Corp.; W. W. Knight, Jr., Plaskon Division, Libbey-Owens-Ford Glass Co.; C. Russell Mahaney, Panelyte Division, St. Regis Paper Co.; and Frank E. Selz, General American Transportation Corp.

Film Group Meets

The twelfth meeting of Group II of the SPI Plastics Film, Sheeting, and Coated Fabrics Division, was held May 8 at the Lexington Hotel, New York. Chairman David S. Plumb, Monsanto Chemical Co., presided over the meeting of the group which was originally formed in December, 1946, to develop standard tests for determining abrasion resistance, tear resistance, tensile strength, hardness, and bursting strength.

Eleven members of the group attended the meeting, which began with a discussion of a recent round-robin study on the tensile and tear properties of films. Frank W. Reinhart, National Bureau of Standards, reported that the various methods investigated, which included the Elmendorf tear test, the ASTM tear test, the pendulum tensile test, the inclined plane test, and several other modifications all gave different results on the films. Data could not be correlated, and it appears necessary for any tensile or tear specification to indicate the test to be used.

In discussing the report, the committee noted that there are four ways to handle the problem, as follows: (1) designate a minimum tensile strength without designating the machine to be used in the test; (2) designate the machine whether it be the pendulum type or static controlled separation type, while setting a limiting test value for each machine; (3) arbitrarily choose one machine to be used; and (4) set a detailed method for operating each machine.

It was decided to revise the present SPI film specification to read: "The minimum tensile strength of the material when tested in accordance with the ASTM Designation D882-49, Method B, entitled, 'Tensile Properties of Thin Plastics, Sheets and Films,' referred to in Paragraph 4.4, shall be 2,100 psi. when tested with the pendulum-type machine; 2,300 psi. when a static controlled separation type machine is used. Either of the above methods may be used. If the films meet two requirements by any number method, the film shall be considered as passed. The minimum ultimate elongation of the materials shall be 150%. These values shall be determined on one-inch wide strip specimens."

Regarding tear resistance, the committee decided that the minimum tear strength in any direction shall be 200 pounds per inch when tested by the "slow tensile" method of ASTM D1004-49T. When tested by the high shear and rate method of ASTM D689-44, the minimum tear strength in any direction shall be 180 grams per sheet for film three mils or less, and 60 grams per mil for sheet thicker than three mils.

Through its representative, Mr. Reinhart, the committee recommended that ASTM consider revising D882-49T and

D1004-49T. Specifically, the committee recommended that ASTM investigate the possibility of finding a specimen which may be used in both pendulum and static controlled separation-type machines in order to obtain the same tensile values; investigate the "rate of pull" of tensile tests; and further consider the correlation between tensile and tear.

Since the work of Group II has been essentially completed, it was decided to recommend to SPI that the group be relieved of its responsibilities and be kept only as a standing committee.

Hyatt Award to Griffith

Palmer W. Griffith, technical service director—West Coast, American Cyanamid Co., was the recipient of the eleventh annual John Wesley Hyatt Award "for achievment of wide importance to the plastics industry." Mr. Griffith received the award, consisting of a gold medal and $1,000, at a banquet on June 5 at the Hotel Pierre, New York. The presentation was made by Gordon Brown, president of SPI, sponsor of the award; and Dan A. Kimball, Secretary of the Navy, was the principal speaker at the ceremonies.

Mr. Griffith was cited for his researches with melamine which developed the material from a laboratory curiosity to a plastic that has become the basis of a new industry. After receiving an M.S. degree from the Massachusetts Institute of Technology, Mr. Griffith joined American Cyanamid in 1922, working in plastics research at the Warners, N. J., laboratories for 13 years. In 1935 he was transferred to sales engineering and technical service activities and in 1943 took charge of technical service on the West Coast.

New Styrofoam Formulation

A NEW formulation of Styrofoam with greatly reduced burning characteristics has been developed by Dow Chemical Co., Midland, Mich. According to A. R. Tucker, head of the company's Styrofoam sales, the new material meets ASTM test requirements for a self-extinguishing plastic, and is expected, therefore, to find greatly increased use, particularly in the low-temperature insulation field. In full production at the Midland plant, the new material will be designated as Styrofoam 33 and tinted a blue color to identify it from the white, unmodified Styrofoam 22 used in the floral and novelty fields, as well as for buoyancy and insulation.

New Polyethylene Tubing

A NEW, special grade of polyethylene Layflat tubing, designed for use as liner in containers for corrosive acids and other bulk materials, has been announced by Plax Corp., Hartford, Conn. In addition to being chemically inert and moistureproof, the new material is also said to be free from tiny pin holes which cause leakage and damage or loss of shipments. Known as DL-Grade, the new tubing is available in wall thicknesses ranging from 0.0015-0.004-inch and in diameter sizes from 25-40 inches.

SPE Sections Meet

Vacuum Metallizing

A TALK on "Vacuum Metallizing" by Sanford S. Zimmerman, F. J. Stokes Machine Co., featured the June 18 dinner-meeting of the New York Section, Society of Plastics Engineers, held at the Gotham Hotel, New York, N. Y. Some 55 member and guests were present at the meeting, the last before the summer recess.

Mr. Zimmerman stated that vacuum metallizing is the deposition of pure metals alloys, or metal salts on a surface under high vacuum conditions. Surfaces are metallized for both functional and decorative applications. The object to be metallized and the metal to be deposited are enclosed in a high vacuum chamber, and a high temperature is applied to the metal or salt. The metal vaporizes, and the vaporized molecules travel from the source in straight lines to deposit themselves on the facing surface.

For decorative purposes aluminum is most commonly used for vacuum metallizing because it is easily vaporized, and the deposited film simulates polished platinum, rhodium, or chromium and does not tarnish. The coating is extremely thin and controllable to 0.000001-inch and seldom exceeds 0.000005 in thickness. Since the metal film reflects any defects in the surface of the part to be metallized, the surface is given an undercoat of lacquer which minimizes these defects and at the same time minimizes out-gassing of plasticizers.

The objects to be metallized are set on racks placed in the vacuum chamber. The aluminum, in the form of small staples, is placed on coils of tungsten wire filaments connected to a source of current. The chamber is exhausted, and the material is ready for metallizing when the pressure in the chamber has been reduced to 0.5-micron (0.0005-mm. Hg) or lower. Evaporation or flashing of the filaments takes place when current is passed through the tungsten wire and heats the staples to incandescence and then evaporation. The metallized parts are given a top coating of lacquer for protection against abrasion. The topcoating can also be dyed to give a bronze, gold, or copper effect.

Parts to be metallized on one side are placed in the vacuum chamber so that the surface to be coated faces the source. Parts to be coated on all sides are placed on revolving spiders driven from outside the chamber. The metal coating is flexible on cloth, paper, acetate sheeting, and other webs which can be coated by winding from one roll to another during the flashing operation.

Section President Bruno E. Wessinger, Wess Plastic Molds, Inc., presided over the business session preceding the talk. Reports were heard from Richard Thews, Monsanto Chemical Co., on the work of the education committee in setting up a plastics vocational high school course in conjunction with the New York City Board of Education; and from Stanley Bindman, Jamison Plastics Corp., on his new appointment as Section news editor for the *SPE Journal*. Table favors were contributed by Arthur L. GeWertz, manufacturers' representative, and the meeting concluded with a drawing for door prizes contributed by King Specialty Co.

Toronto Panel Discussion

A "Stump the Experts" panel discussion featured the May 20 dinner-meeting of the Toronto Section, SPE, held at the St. Regis Hotel, Toronto, Ont., Canada, with 42 members and guests attending. Tom J. Carey, Canadian General Electric, Ltd., acted as moderator, and panel members were: injection molding, Finley McEwen, Duplate Canada, Ltd.; compression molding, Trygve Wold, Smith & Stone, Ltd.; design and engineering, W. H. Lynch, Maple Leaf Plastics Ltd.; and customer evaluation, B. Kellam, Hydro-Electric Power Commission of Ontario.

The first question before the panel dealt with allowances for mold shrinkage. It was concluded that it is not possible to forecast the exact shrinkage. Where tolerances are close, it is necessary to use trial-and-error methods and rely on judgment and previous experience to predict shrinkage. Data available from material suppliers cannot be relied upon entirely because shrinkage is also dependent on the casting machine and, in the case of thermoplastics, on the type and location of gating.

Questioned as to the future of plastic piping, the panel noted that studies of the corrosion on underground pipe and conduit are being made. Because of the relatively high thermal expansion of some plastic piping, installation methods are of great importance, and more information is needed on connections, fittings, etc. Injection molders should work very closely with pipe extruders to avail themselves of the large potential market for pipe fittings.

In reply to a question as to the possible uses for flash from thermosetting moldings, the panel said that melamine and urea flash can be sold for fertilizer; whereas phenolic flash has found very little use. As much as 10% reground flash has been worked into virgin molding material, but some molders have reported excessive rejects with this procedure. It may be possible to use ground melamine flash as an insulating material, and any of the thermosets may be suitable as a packing in low-pressure fractional distillation columns.

The next question dealt with the causes and possible remedies for the checking of styrene moldings after lacquering and aging. It was agreed that checking is caused by strains in the piece and the lacquer solvents. Annealing is the best method to relieve molding strains, and it also increases the dimensional stability of the piece. Proper selection of lacquers, in addition to annealing of the part, will minimize checking.

The final question concerned the avoiding of cracking of urea moldings, especially transfer or plunger molded parts, after a period of time. It was pointed out that urea parts made by these molding methods are not dimensionally stable, but are affected by moisture, temperature, etc. New materials being developed may eliminate this difficulty, but with current materials transfer and plunger molding should be avoided.

Ladies Night at Buffalo

The Buffalo Section held its annual Ladies Night on May 16 at the Park Lane Restaurant, Buffalo, N. Y., with Warren H. Goodwin, *Modern Plastics*, as guest speaker. Entitled "What Every Consumer Should Know about Plastics," his talk emphasized the need of proper design and proper utilization of properties of the various plastics in consumer products. The talk was illustrated by samples of plastics products, distributed as door prizes.

The Section's June 20 dinner-meeting, a joint affair with the Toronto Section, was held at the St. Regis Hotel, Toronto. Speaker was Carl Sundberg, Sundberg-Ferar, who discussed "Design in the Plastics Industry."

Future of Plastics

The Eastern New England Section, SPE, ended the current season with a joint dinner-meeting with the Boston-Providence Chapter, SPI, on May 25 at the Beaconsfield Hotel, Brookline, Mass. Approximately 60 members and guests heard Hiram McCann, *Modern Plastics*, speak on "Plastics Futures."

The plastics industry faces a twofold challenge in the immediate and distant future, Mr. McCann said. On one hand the industry is faced with an ever-increasing supply of plastics raw materials, and on the other with vast potential markets that are still undeveloped or only slightly tapped. Synthetic resin production is forecast at 2.6 billion pounds for 1952 and is expected to be between 3.8 and 4.7 billion pounds by 1955 on the basis of already announced expansion plans and already issued certificates of necessity. The industry must now open new markets and further develop others to handle this production volume and insure continued growth.

Chicago Golf Outing

More than 55 members and guests of the Chicago Section SPE, and the Midwest Chapter, SPI, attended a joint golf outing June 20-22 at Nippersink Manor, Genoa City, Wis. Prizes estimated at more than $700 in total value were distributed to everyone present, with the principal winners being: driving contest, Jim Lohr, Plastic Engineering Co.; bind bogey, Ben Rau, G. Felsenthal & Sons, and Maurice Meltzer, Service Plastics Co.; and grand prize of the week-end for two at Oakton Manor, Keewauke, Wis., Harry Slotag, G. Felsenthal & Sons. The committee in charge of arrangements for the outing was headed by Warren Cooper, Tennessee Eastman Corp., and Mr. Meltzer.

Hold Plant Tour

The last meeting of the Upper Midwest Section before the summer recess was held on May 19 and consisted of a trip to the plants of the Peerless Chain Co. and the Fiberite Corp. at Winona, Minn. Peerless is an important manufacturer of all types of chain, using many specially designed machines; while Fiberite produces impact resistant phenolic molding compounds. Some 42 members and guests of the Section participated in the tour, which was concluded with a cocktail hour and dinner at the Oaks Club of Winona.

The April 21 dinner meeting of the Upper Midwest Section was held at the Midway Club St. Paul, Minn. Speaker of the evening was David J. Sloane, Lester Engineering Co., who discussed "A Proposal for Establishing Certified Injection Molding Machine Specifications." Mr. Sloane's talk was based on the paper which won first prize in the 1951 SPE Prize Paper Contest.

Plastics Motion Picture

A NEW color-sound motion picture, "Flight to the Future" has been produced by Bakelite Co., Division of Union Carbide & Carbon Corp., New York, N. Y. Using a cast of professional actors, the film presents a lively and entertaining story based on the widespread use of plastics in home and industry and at the same time gives a condensed education in the many advantages and uses of modern plastics. The cast is headed by Lyle Talbot and John Eldridge, and the main action of the story takes place in an airplane which carries four principal characters representing different phases of the plastics industry. Designed for general public audiences, the film will be released September 1 for national distribution to schools, colleges, clubs, granges, and other interested groups, with no charge except for transportation. The picture is on 16-millimeter film and has a running time of about 37 minutes.

CALENDAR

July	22.	Buffalo Rubber Group. Summer Outing. Transit Valley Country Club.
July	25.	Chicago Rubber Group. Golf Outing. St. Andrew's Country Club.
Aug.	5.	New York Rubber Group. Golf Tourney.
Aug.	22.	Philadelphia Rubber Group. Summer Outing. Cedarbrook Country Club.
Sept.	8-10.	American Standards Assn. Third National Standardization Conference. Museum of Science & Industry, Chicago, Ill.
Sept.	9-13.	Seventh National Chemical Exposition. Coliseum, Chicago, Ill.
Sept.	10-12.	National Petroleum Assn. Annual Meeting. Traymore Hotel, Atlantic City, N. J.
Sept.	13.	Connecticut Rubber Group. Summer Outing.
Sept.	19.	Chicago Rubber Group. Morrison Hotel, Chicago, Ill.
Sept.	25.	Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.
Oct.	3.	Detroit Rubber & Plastics Group, Inc.
Oct.	6-10.	National Hardware Show. Grand Central Palace, New York, N. Y.
Oct.	7.	The Los Angeles Rubber Group, Inc. Hotel Mayfair, Los Angeles, Calif.
Oct.	8.	Newark Section, SPE. Military Park Hotel, Newark, N. J.
Oct.	9.	Northern California Rubber Group.
Oct.	11-15.	National Assn. of Waste Material Dealers, Inc. National Fall Meeting. Ambassador Hotel, Los Angeles, Calif.
Oct.	15.	Washington Rubber Group. New York Section, SPE. Hotel Gotham, New York, N.Y.
Oct.	17.	Akron Rubber Group.
Oct.	24.	New York Rubber Group. Henry Hudson Hotel, New York, N. Y.
Oct.	28.	Assn. of Consulting Chemists & Chemical Engineers. Annual Symposium. Belmont Plaza Hotel, New York, N. Y.
Oct.	29-31.	Division of Rubber Chemistry, A. C. S. Hotel Statler, Buffalo, N. Y.
Nov.	6-8.	American Assn. of Textile Chemists & Colorists. Annual Meeting. Statler Hotel, Boston, Mass.
Nov.	12.	Newark Section, SPE. Military Park Hotel, Newark, N. J.
Nov.	14.	Philadelphia Rubber Group. Poor Richard Club, Philadelphia, Pa.
Nov.	19.	New York Section, SPE. Hotel Gotham, New York, N. Y. Washington Rubber Group. American Standards Assn. Annual Meeting. Hotel Waldorf-Astoria, New York, N. Y.
Nov.	21.	Chicago Rubber Group. Morrison Hotel, Chicago, Ill.
Nov.	25.	Manufacturing Chemists Assn. Semi-Annual Meeting and Winter Conference. Statler Hotel, New York, N. Y.
Dec	1-6.	National Exposition of Power & Mechanical Engineering. Grand Central Palace, New York, N. Y.
Dec.	4.	Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.

New Plastics Molding Firm

REL PLASTICS CORP., a new plastics company, is now in full operation in East Paterson, N. J. According to Lazzaro A. Fattori, Jr., president, this firm specializes in the injection molding of proprietary plastics products. The company occupies its own modern plant and office building of approximately 5000 square feet, situated on a five-acre plot, which allows ample room for expansion. Starting production the first of this year, Rel is now operating a battery of injection molding machines at capacity, running three shifts a day, five days a week, with a force of about 70 employes.

According to Mr. Fattori, the company is manufacturing such items as combs, toys, and a complete line of sun glasses, which are being marketed throughout the United States. Rel has a branch office in Kansas City, Mo., and sales offices in Atlanta, Ga., Cleveland, O., New York, N. Y. Philadelphia, Pa., and Boston, Mass.

Mr. Fattori is a graduate of Stevens Institute of Technology and has had plastics experience with Columbia Protektosite Co., Inc., and A. J. Desimone Corp. Other Rel officers are Joseph A. Jackovics, vice president and director of sales; Vincent J. Calcagno, vice president and credit manager; Frederick J. Gassert, Jr., secretary; John Licsko, treasurer; and Bruno Gruppo, comptroller.

New Velon Designs

Firestone Plastics Co., Pottstown, Pa., is offering a wide range of new designs in Velon plastic upholstery sheetings, including embossed textures, printed surfaces, and quilted patterns. Designed by Walter M. Litter and offered in selected colors, the new patterns have been planned to fit unlimited decorative applications. The new patterns follow: Normandy, a texture pattern with a stylized leaf motif available in seven colors; Illusion, a small continuous pattern texture available in seven colors; Royal Calf, a leather-like print on a lightly embossed surface, made in nine colors; Whirl, a small circular printed design made in seven colors; Surf, a printed design having the effect of brush strokes, made in seven colors; Celebrity, a linear abstract now available in a new range of five colors; Cathay, a modern cross-bar brush stroke design in nine colors; and a new series of geometric quilted designs made in four colors and including Roadways, Diamond, Channel, and Tile.

Scientific and Technical Activities

Rubber Division, C. I. C., Montreal Meeting

THE Rubber Chemistry Division of the Chemical Institute of Canada held a meeting at the Sheraton-Mount Royal Hotel in Montreal, P.Q., Canada, June 4. The meeting was a part of the thirty-fifth annual conference of the C. I. C. Abstracts of the papers presented appeared in our May, 1952, issue on page 241.

At the business meeting of the Division the following men were nominated for officers and members of the executive committee for the period June, 1952, to June, 1953. Chairman, T. L. Davies, Polymer Corp., Ltd.; vice chairman, George Stevens, Goodyear Tire & Rubber Co. of Canada, Ltd.; and secretary-treasurer, E. Bolton, B. F. Goodrich Co. of Canada, Ltd. Members of the executive committee also nominated in addition to the above officers, are H. E. Hencher, J. L. Blachford, Ltd.; G. S. Baxter, Firestone Tire & Rubber Co. of Canada, Ltd.; and R. Gorrie, Delacour-Gorrie, Ltd.

Papers given before other Divisions of the C. I. C. of interest to the rubber and plastics industry of both the United States and Canada were as follows:

"The Relative Efficiencies of Hydroperoxides as Initiators of Emulsion Copolymerization." R. J. Orr and H. Leverne Williams, Polymer Corp.

"Kinetic Studies of a Redox Polymerization." C. A. Winkler and R. M. Brown, McGill University.

"Benzoin Sensitized Polymerization of Methyl Methacrylate." B. R. Chinmayanandam, University of Birmingham, England, and National Research Council, Ottawa, Canada.

"Thermal Degradation of Polymethyl Methacrylate." S. Bywater, NRC.

"Waste Control at a Chemical Plant." W. J. Hogg, Naugatuck Chemicals Division, Dominion Rubber Co., Ltd.

"Dielectric Dispersion in Vinyl Polymers." B. L. Funt and T. H. Sutherland, University of Manitoba.

"A Study of the Influence of Polymerization Temperature and Catalyst System of the Extent of Branching of a Polymer." L. H. Cragg and G. R. H. Fern, McMaster University.

"The Use of the Mooney Plastometer to disclose Structural Effects in High Polymers—A Preliminary Note." D. Fensom, Ridley College.

The 1953 annual conference will be held in Windsor, Ont., June 4 to 6.

Car-Bel-Ex A—New Extender

CAR-BEL-EX A, a new vulcanized oil-type extender for natural and synthetic rubbers, has been developed by Carter Bell Mfg. Co., Springfield, N. J., and is available from Harwick Standard Chemical Co., Akron, O. The new extender is low in cost and similar to high-quality brown vulcanized oils in physical appearance and milling characteristics. Available in cake form Car-Bel-Ex A has a specific gravity of 1.04, ash content of 0.5%, hardness of 15-25, and acetone extract of about 35%.

A. C. S. Rubber Group Program Service

AT THE meeting of the executive committee of the Division of Rubber Chemistry of the American Chemical Society in Cincinnati, O., May 2, representatives of practically all the Division's sponsored local rubber groups were present during the discussion of the various matters of mutual interest. S. G. Byam, E. I. du Pont de Nemours & Co., Inc., vice chairman of the Division and chairman of the liaison committee, reported that a serious attempt to provide helpful service with respect to rubber group programs would be made.[1]

Specifically, the liaison committee offered to be a clearing house between rubber groups and suppliers to the rubber industry who might have technical papers on rubber subjects with speakers available to the Groups. In addition to notices to rubber group secretaries, the program service and the available papers will be publicized in India RUBBER WORLD and *Rubber Age*.

In two notices to rubber group secretaries dated May 12 and May 27, respectively, Mr. Byam has advised that the following papers are available for presentation before the various groups.

1. **"Methods Employed in Compounding Research,"** by I. Drogin, director of research, United Carbon Co., Charleston, W. Va. This paper was given before the Los Angeles and Northern California Rubber groups in April.
2. **"Surface Coating and Impregnation of Fabric,"** by C. A. Litzler, president, Industrial Ovens, Inc., Cleveland, O. This paper was presented before the New York Rubber Group on April 4. (Mr. Litzler will be out of the country in September and October and will therefore not be available to give this paper during that period.)
3. **"Mixing and Mixing Problems,"** by A. Szegvari, president, Union Process Co., 120 Ashland St., Akron, O.
4. **"Neoprene Maintenance Coatings,"** by L. S. Bake, E. I. du Pont de Nemours & Co., Inc., Rubber Laboratory, Wilmington, Del. This paper was originally presented before the St. Louis Section of the National Association of Corrosion Engineers at St. Louis, Mo. It is scheduled to be presented before the protective coatings committee of the du Pont company at Louisville, Ky.
5. **"Neoprene Solutions,"** by A. Mitchell, du Pont Rubber Laboratory. This paper was originally presented before the Elastomer & Plastics Section, Northeastern Section, A. C. S., Boston, Mass.
6. **"Compounding Reclaim with New Elastomers for High Quality at Low Cost,"** by M. F. Torrence and H. G. Schwatz, du Pont Rubber Laboratory. This paper was originally presented by E. R. Bridgwater at the International meeting of the Buffalo and Toronto Rubber groups at Niagara Falls, Ont., Canada, in May.

If Rubber Groups are interested in these talks, it is requested that arrangements be made by the chairman or secretary of the Group directly with the individuals of the various companies listed above, sending a copy of the letter to the chairman of the liaison committee of the Rubber Division, A. C. S.

[1] India RUBBER WORLD, June, 1952, p. 386.

Rubber Division, A. C. S., Fall Meeting

AS MENTIONED last month, the fall meeting of the Division of Rubber Chemistry of the American Chemical Society will be held in Buffalo, N. Y., October 29 to 31, with headquarters at the Hotel Statler. The local committee chairman is J. G. Augensten, of U. S. Rubber Reclaiming Co.

The 25-Year Club will hold one of its regular luncheon-meetings at noon on October 29, with H. F. Van Valkenburgh, of the Dunlop Tire & Rubber Corp. in charge, and the technical sessions will start at 2:00 p.m. the same day. The banquet of the Division will be held on Thursday, October 30, preceded by a suppliers' cocktail party.

C. R. Haynes, Binney & Smith Co., secretary of the Division, points out in a letter to members dated June 12 that these meetings can be successful only if there is an adequate supply of technical papers for presentation. The papers committee would like abstracts of about 200 words describing the research on which a paper is based, and these abstracts, in triplicate, should be in the secretary's hands on or before September 16. As usual, they must show in what laboratory the work was done, and a statement is to be made as to the amount of time desired for presentation. The author or one of the co-authors must be a member of he A. C. S. At the time of the meeting three copies of the finished paper must be available for the secretary of the Rubber Division.

In addition, abstracts for the meeting in Los Angeles, Calif., to be held March 18 to 20, 1953, should be in the hands of the secretary on or before January 3, 1953, and for the meeting in Boston, Mass., to be held May 27 to 29, 1953, the secretary, requires abstracts not later than April 16, 1953.

Hauser Receives Honorary Degree

WORCESTER POLYTECHNIC INSTITUTE, Worcester, Mass., conferred the honorary degree of Doctor of Science on Ernst A. Hauser, professor of colloid chemistry at Massachusetts Institute of Technology and visiting professor of colloid chemistry at Worcester Polytechnic, at its commencement exercises on June 14.

Dr. Hauser has been a professor at MIT since 1928 and is well known in the rubber industry for his work with natural rubber latex, synthetic rubber, and high polymers and reclaimed rubber. He is the author of many technical papers and several books in the field of rubber and high polymers.

In 1948 the Chicago Section of the American Chemical Society included Dr. Hauser as one of the "ten ablest chemists or chemical engineers" working in the field of rubber in the United States.

India RUBBER WORLD congratulates Dr. Hauser on this new honor that has come to him.

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Groups Hold Outings

Good Weather for New York!

FOR the first time in three years the New York Group was favored with good weather for its summer outing held at Doerr's Grove, Millburn, N. J., on June 12. About 170 members and guests attended the affair, and participation in the various events was very gratifying to the arrangements committee headed by George N. Vacca, Bell Telephone Laboratories.

Winners of the various events held during the afternoon were as follows: boccie, Tom Loser, Georgia Marble Co., and Mel Lerner, *Rubber Age*; baseball throw, A. Goldsmith, H. Muehlstein & Co., and S. B. Robinson, Esso Standard Oil Co.; darts, M. Master, Niagara Rubber Co., and R. J. Love, Pequanoc Rubber Co.; horseshoes, W. Lamela, Okonite Co., and Mac Doane, H. V. Hardman Co.; basketball throw, B. Silverstein, Geo. Wolloch Co., and M. R. Buffington, Lea Fabrics; golf driving, H. R. Shafer, Binney & Smith Co., and O. J. Zeiller, Titanium Pigment Co.; egg throw, D. Ebersbach and G. Campbell, both of American Hard Rubber Co.

The team captained by Russ Kurtz, E. I. du Pont de Nemours & Co., won the tug-of-war. A. N. Gessler, Esso, was captain of the team which won the softball game.

A buffet lunch and ample beer and soft drinks during the afternoon added to the enjoyment of the occasion, and a chicken dinner was served at 5:30 p.m. It was decided, however, that at the next outing of the Group the full-course dinner in the evening would be dispensed with, and a continuing buffet lunch during the afternoon with plenty of beer and soft drinks would be a more satisfactory arrangement.

Golf in a Heat Wave

The Rhode Island Rubber Club held its annual summer outing on June 26 at the Metacomet Golf Club, East Providence. A record attendance of 184 members and guests participated in the outing despite an official temperature reading of 101.4° F. It was the hottest June day in the history of the local weather bureau, and many of the golfers confined their activities to putting on the green instead of going around the 18-hole course.

In the members' low gross, first prize went to F. V. Newman, Respro, Inc., second prize, Dave Scott, Collyer Insulated Wire Co.; and third prize, Arthur Perry, E. I. du Pont de Nemours & Co. Inc. First prize for guests' low gross was won by William Clarke, Arnold Hoffman & Co., Inc.; second prize, Thomas Joy, Gulf Oil Co.; and third prize, W. A. Forbush, Avon Sole Co. Low net prizes were won by Lyle Longworth, Monsanto Chemical Co.; Francis Burger, Kleistone Rubber Co.; and Fraser Malcolm, Titanium Pigment Corp. Awards in the blind bogey contest went to Charles Haynes, Binney & Smith Co.; Mal Langford, Dow Corning Corp.; and John Hussey, Goodyear Tire & Rubber Co. Putting contest prizes were won by William Maguire, United Carbon Co.; Eli Braley, guest; and Stanley Szulik, Acushnet Process Co.

Other golf prize winners were as follows: nearest to pin on fifth hole, John Kelly, Respro, Inc.; nearest to pin on seventh hole, John Marshall, Collyer Insulated Wire; nearest to pin on tenth hole, Al Kroepel, C. K. Williams & Co., Inc.; most 6's, William Kugler, Taylor Instrument Cos.; most 7's, G. F. Jacobson, United States Rubber Co.; most 8's, John MacKay, Phillips Petroleum Co.; high gross, Joseph Powell, D. H. Litter Co.; high net, Webster Day, du Pont; and longest drive, Marvin Wilner, Plymouth Rubber Co.

Arrangements for the outing one of the most enjoyable in the Club's history, were handled by a committee of the group's directors as follows: Kenneth Priestley, Leigh Kingsford, and Roy Volkman, U. S. Rubber; Gilbert Enser, Collyer Insulated Wire; Harry Ebert, Firestone Tire & Rubber Co.; Ray Szulik, Acushnet Process; Urbain Malo, Crescent Corp.; and Messrs. Burger and Newman.

SORG Enjoys Good Day

The Southern Ohio Rubber Group held a highly successful summer outing on June 7 at the Inland Activities Center, Dayton, O. William L. Nolan, Inland Mfg. Division, General Motors Corp., was general chairman of the outing committee and was assisted by the following: golf, Howard Butler and Bill Clingman, both of Inland; food, J. E. Feldman, Paul Ganger and W. R. McGlothin, all of Inland and L. J. Fitzharris, Frigidaire Division, General Motors; beer, James Saettel, Frank Ekberg, Tom Hufziger, John Russell and Harold Weese all of Inland; shuffleboard, Harold Bell, Firestone Tire & Rubber Co.; basketball throw Bud Dill, Dayton Rubber Co.; horseshoes, John Poffenberger, Cincinnati Rubber Mfg. Co.; foot golf, Chuck Wimmer, Phillips Chemical Co.; baseball, Roy Marston, Binney & Smith Co., Bob Sucher, Marbon Corp., George Lapois, Inland, and J. C. Haren, Precision Rubber Products Co.; card games, John Walsh, Xylos Rubber Co., and Dayle Buchanan, Inland; registration Mr. Fitzharris and Russ Hoskin Inland; and door prizes, Feldman, Fitzharris, and Hoskin.

In the baseball game, the industry team from Inland defeated the suppliers team. Many prizes were distributed to other contest winners with first prizes going to the following: basketball throw, Mr. Clingman; horseshoes, Bob Overman and Mr. Clingman, Inland; kick golf, Milt Leonard, Binney & Smith; shuffleboard, Jim Wall, Inland, and Mr. Hoskin; and golf tournament, Bert Stangor, E. I. du Pont de Nemours & Co., Inc. Some 70 door prizes were also distributed among the members and guests attending the outing.

Golf for Quebec

The annual golf tournament of the Quebec Rubber & Plastics Group was held June 6 at the Granby Golf Club, Granby, P.Q., Canada. The tournament atttracted 81 members and guests; while 104 were present at the dinner concluding the event. Low gross prize went to C. P. Dearth, Bolta Plastics Co., and 40 door prizes were awarded. Arrangements for the tournament were ably handled by R. Harrison, Canadian General Electric Co., Ltd., and A. Beauchamps, Dominion Rubber Co., Ltd.

Officers of the Group for the 1952-1953 season were announced as follows: chairman, W. R. Blondell, Dominion Rubber; and secretary-treasurer, W. Edward, Delacour-Gorrie, Ltd. M. Renshaw, British Rubber Co., Ltd., will be in charge of publicity for the Group, and other committee chairmen are Messrs. Beauchamps and Harrison; C. W. MacEachern, General Latex & Chemicals (Canada), Ltd.; A. S. Johnston, Northern Electric Co., Ltd.; G. Fournier, Acton Rubber, Ltd.; E. Halsall, Dominion Rubber; R. Woolerton, Dominion Oilcloth Co., Ltd.; F. King, Canadian Resins & Chemicals Co., Ltd.; E. May, Dominion Rubber; and A. MacAulay, Northern Electric.

New Statex 125 Black

A NEW carbon black, Statex 125, is now in production by Columbian Carbon Co., 41 E. 42nd St., New York 17, N. Y. At present the new black is going into tires for only the highest powered of the new automobiles, according to company president, Carl E. Kayser. Growing output later in the year is expected to supply the new product in sufficient quantities to permit use in wear resistant tires for all cars.

A need of the new black developed because cars of 100 horsepower and over wear out tires too fast, Mr. Kayser said. Tire slip with respect to the pavement is a principal cause of tire wear and occurs during driving as well as at starts and stops. In normal driving this slip may be 1-3%, but it increases as car speeds and power go up. The sharp rise in power of the latest car models has about doubled slip, with resultant excessive tire wear.

Statex 125 was developed as the result of cooperative work with leading tire manufacturers. Road tests made by tire manufacturers are said to have shown that Statex 125 adds 20-30% longer life to tires than the best carbon blacks heretofore made. The new black, designated as SAF (super abrasion furnace), is made by a modified furnace process from the heavy residual oils of the petroleum industry. The new product can be worked in tire tread compounds by conventional methods and equipment. Tire tread stock compounded with Statex 125 shows superior physical and processing characteristics in extensive tests under production conditions.

Discuss Guayule Rubber

A TALK on "Production Research on Guayule and Latin American *Hevea* Rubbers" by Robert D. Rands, Division of Rubber Plant Investigations, United States Department of Agriculture, featured the May 21 meeting of the Washington Rubber Group, held at the Pepco Auditorium, Washington, D. C.

The first portion of Dr. Rands' talk summarized the Department of Agriculture's research on guayule production in relation to the defense picture. The cultivation of guayule by the government is a strategic move, designed to supplement imported natural rubber during wartime or other critical periods. It requires four to five years to bring guayule to a mature crop, and the program during World War II was thought to be an economic failure because the war ended before the first crop could be harvested. Recent developments in the domestication of the guayule shrub in southwest Texas and northern Mexico through a program of cross-breeding, as well as recent government tests on

(Continued on page 532)

NEWS of the MONTH

Paley Report Predicts Rubber Consumption To Double by 1975; Rubber Act Extended for 21 Months

The President's Materials Policy Commission made its report on June 23 on the long-range demand and supply outlook for the many raw and manufactured materials used by the United States. The Commission, headed by William S. Paley, chairman of the Columbia Broadcasting System, predicted that the consumption of rubber may double in the United States over the next 25 years and that the majority of the increased consumption may, of necessity, be synthetic rubber. Use in transportation products is expected to increase from one million tons in 1950 to 1.6 million tons in 1975 and in non-transportation products from 0.6 million tons in 1950 to 1.7 million tons in 1975.

The Rubber Act was extended for 21 months to March 31, 1954, but the Reconstruction Finance Corp. is to provide the President and the Congress by March 1, 1953, with a program for disposing of the synthetic rubber plants. The President is required to put this program in the form of legislative recommendations to Congress by April 15, 1953. RFC has aready begun meetings with representatives of the rubber, chemical, and petroleum industries in order to formulate the disposal plan.

The General Service Administration, which turned the importation and distribution of natural rubber over to private industry on June 30, announced plans to rotate 25,000 tons of natural rubber during the last half of 1952.

Rubber Order M-2 was again revised, on June 6, to permit consumption of #3 pale crepe, to increase the allowable consumption of LTP GR-S to 70% of manufacturers quarterly total, and to increase permitted rayon tire cord from 120 to 130% of base-period usage.

The removal of ceiling on tire prices was denied by the Office of Price Stabilization. Many firms cut truck tire and tube prices from 2½ to 7½%.

The Rubber Manufacturers Association, Inc., will conduct meetings on crude rubber quality, packing and inspection in Akron, Trenton, New York, Boston, Chicago, and Los Angeles during the last quarter of the year to "assist rubber manufacturers to get what they pay for in buying natural rubber."

The United Rubber Workers of America, CIO, began talks in June with Goodrich, Firestone, and Goodyear. A wage increase of 20¢ an hour, improved pension and insurance programs, productivity pay increases, and other benefits are being discussed.

Washington Report

By

ARTHUR J. KRAFT

Materials Policy Commission Report

The President's Materials Policy Commission issued in June a five-volume report, "Resources for Freedom," which represented the results of more than a year of exhaustive inquiry into the long-range demand and supply outlook for the host of raw and manufactured materials used by this country. The Commission, headed by William S. Paley, chairman of the Columbia Broadcasting System, came up with some findings and forecasts on rubber which are expected to have an important bearing on future government policy as well as contribute to the planning decisions of private industry.[1]

The more important of these findings in the summary are:

1. Consumption of rubber may double in the United States over the next 25 years and increase at an even greater rate overseas.

2. Natural rubber production will be unable to keep pace with these increased demands, and it is doubtful whether output of natural rubber will increase very much over present levels. An increase of natural rubber production from the 1950 total of 1,855,000 tons to 2,500,000 tons by 1975 is about all that may be expected.

3. Synthetic rubber production is expected to fill the gap, increasing worldwide by at least 1.5 million tons, with the United States accounting for about one million tons of the increase.

4. Supplies of basic petroleum feedstocks in this country would not be strained to meet a U. S. expansion of synthetic rubber output of 2.5 million tons—equal to the projected U. S. consumption of total new rubber in the year 1975.

5. Early disposal of the government's synthetic rubber plants to private industry should be pressed for. Additional plants should be constructed to keep in step with expanding demand for rubber.

6. With private operation, the costs of producing synthetic rubber may be higher, but the committee believes industry will be able to sell GR-S type of synthetic rubber at between 20 and 25¢ a pound, meeting all costs and making a normal profit.

7. The U. S. demand for rubber is projected at 3.3 million tons by 1975, including 800,000 of reclaim and 2.5 million tons of new rubber. These figures may be compared with 1950 consumption of 1.6 million tons, including 300,000 tons of reclaim. In the section on rubber, the Commission makes no effort to estimate how the 2.5 million tons of new rubber demand in 1975 will be divided between synthetic and natural rubber, but elsewhere in the report, it comes up with the figure of two million tons as the likely 1975 production of synthetic rubber in the U. S. This figure is double current capacity and more significantly almost equals the anticipated increase in total new rubber demand for 1975.

In discussing the rubber supply and demand outlook, the Commission makes a real effort to avoid hasty conclusions, but it clearly holds far from sanguine hopes for any major expansion in natural rubber usage here. For one thing, it sees the cards stacked increasingly in favor of synthetics on a quality basis as time goes on, but its major doubts have to do with other factors which will keep production of natural rubber from rising much over today's level.

In a windup statement on security considerations, the Commission comes very close to putting all its eggs in the basket marked "Synthetic Rubber." The Commission said:

"Should natural rubber production fail to expand significantly, the United States and other free countries should increase synthetic rubber production at a correspondingly greater rate, and thus be closer to plant capacity levels that might be required in a war emergency."

In another part of the report the Commission leaves the impression that it expects the Soviet Union to absorb a fairly large share of the additional natural rubber expansion foreseen in southeast Asia over the next 25 years.

However, in calculating free world rubber consumption for 1975, the report assumes a natural rubber output of 2.5 million tons and the Soviet sphere of countries taking 200,000 tons of it, the same tonnage they took in 1950. Thus consumption is figured at 2,300,000 tons of natural rubber and 2,700,000 tons of synthetic rubber, a total new rubber demand of 5,000,000 tons, equally divided as between the U. S. and the rest of the free world. Reclaimed rubber consumption is projected at 1,200,000 tons by 1975, with the U. S. using 800,000 tons and the rest of the free world, 400,000 tons.

Rubber Use—1975

As for how the U. S. will use its rubber in 1975, the Commission draws this prospective picture:

Transportation items, which accounted for about one million tons of new and reclaimed rubber in 1950, will take about 1.6 million tons 25 years later. Non-transportation uses, which took 600,000 tons in 1950, will up their share to 1.7 million in 1975.

The reasoning behind these projected demand figures is that the rate of replacement is assumed to remain unchanged for passenger-car tires at 1.29 per car in use, but drop from 1.25 to 1.1 for truck tires, because of an expected greater use of recapping. Applied to the projected 1975 car and truck populations, there emerges a projected replacement demand for 84 million passenger-car tires and 22 million truck tires. The new-car demand for some 35 million passenger-car tires (assuming five per car) and new truck demand for some 18 million truck tires (at seven per truck) yields a total 1975 demand for 119 million passenger-car tires and 40 million truck tires, as compared with the 1950 demand for 83 million passenger-car and 25 million truck tires. Since a truck tire contains about four times the rubber in a

[1] Chapter 20—"Rubber—Natural and Synthetic," appears on page 501.

passenger-car tire, the total projected demand is equal to 279 automobile tires, as compared with the 1950 equivalent of 182 million, an increase of 53%. This percentage is applied to tubes, the other bulk transportation item, which is expected to increase correspondingly. The Commission expects any increase in durability of tires to be offset by decreased rubber content.

As for non-transportation uses, the Commission noted that they have increased more than fivefold in the past 25 years and may be expected to grow rapidly. Increasing industrial use of rubber, such as in conveyor belts, "is almost certain," as is increasing use of foam rubber in household applications. The report also called attention to the experimental development of a technique for using rubber in road construction.

Stockpiling

In yet another section of the report, the Commission reviewed and analyzed the government's stockpiling program and policy. Speaking generally of stockpile buying, the Commission suggested that greater coordination among government agencies "might help to reduce the swings between overly cautious and overly daring government buying and improve the commercial record of stockpiling." The Commission noted that the Munitions Board has established to date so-called "peril points" setting the minimum objectives for over 50 of the 71 items on the strategic stockpiling list, and criticized this approach in these words:

"The peril point objectives were not determined by any kind of formula; guiding considerations have not been limited or defined. The objectives that have been specified, therefore, have no clear meaning, and it is doubtful whether they can play a useful role in decisions on stockpiling allocations (dividing up the available supply between civilian use and the stockpile —EDITOR). It might be more meaningful for the Munitions Board to spell out what a delay in acquisitions, or a shortfall in inventories below objectives, might mean in terms of supplies of a certain material, should war break out on a certain date. For purposes of persuasion, this approach might be more effective than the presentation of an arbitrary peril point figure."

With this suggestion and criticism of the stockpiling policy, the rubber industry probably could find itself in hearty concord. Rubber goods manufacturers, from the start of tough consumption controls imposed in the Fall of 1950, were unable to get from the Munitions Board a satisfactory explanation of the rubber stockpile objective, and particularly how it was determined. Judging from the Paley Commission's findings on this question, the industry apparently was not off the mark in questioning the reasonableness of the stockpilers' demands.

In seeking the rubber for this program objective, the Munitions Board, at first, made its demands directly upon the National Production Authority, which complied with the necessary heavy cuts in allowable consumption. Until the creation of an inter-agency committee to allocate the supply as between stockpile and other demands, this compliance was more in the nature of submission by the civilian agency. The inter-agency group, the Vital Materials Coordinating Committee, headed by the Defense Production Administrator, was faced pretty much with the same problem from the Munitions Board—stockpile objectives which were determined without benefit of "any kind of formula." Rather than act arbitrarily with possible damage to national security, but at the same time trying to maintain civilian production at the highest level consistent with the military's need, this committee made several efforts to get the Munitions Board to take another look at its rubber stockpile program. After many months, in which persuasion yielded to some backstage sniping, the Board finally modified the rubber stockpiling program—extending the time in which the goal is to be attained by at least a year.

The Paley Commission report also noted the effect of exclusive government buying programs. It did not work for tin, but did for rubber, the Commission said. In the case of rubber, it said, "exclusive government buying succeeded in bringing the price down sufficiently to assure fresh deliveries to the strategic stockpile."

Commission Report Purpose

The Paley Commission was called into being by President Truman to fill a void in the nation's essential knowledge. Various government and industry leaders have been concerned for some time over the drain on our resources occasioned by the enormous use of raw materials for rearmament, a program which promises to continue for a long while. The United States, it has generally been suspected, is rapidly changing from a "have" to a "have not" nation in an increasing number of raw materials.

The Commission was given the job of exploring the entire field and coming up with an authoritative picture, using both a broad and a fine brush, of the near and long-range requirements and supply outlook. The President also asked the Commission to study the "consistency and adequacy of existing government policies, plans and programs and the consistency and adequacy of private industry practices," as they relate to the balance sheet of raw materials demand and supply.

The 813 pages of tightly written findings cannot readily be summarized for all materials. Generally the Commission gave support to private efforts to meet the higher materials requirements which will be with us in the coming few decades. It also took a strong stand in favor of reducing trade barriers in recognition of the growing dependence on outside sources of raw materials.

Rubber Act Extended 21 Months

Congress approved in June a 21-month extension of the four-year-old Rubber Act of 1948, keeping the law on the books until March 31, 1954. In doing so, the legislators set March 1, 1953—eight months away—as the target date for RFC to hand over to the President and Congress a program for disposing of the government's synthetic rubber plants. The President, after clearing with the National Security Resources Board, is required to put this program in the form of legislative recommendations to Congress by April 15, 1953.

The 21-month extension voted by both houses of Congress represents an uneven compromise between the two-year extension previously approved by the House and the one-year extension previously approved by the Senate.

RFC got rolling formally on the job of drafting a disposal program with the appointment by Administrator H. A. MacDonald on June 6 of Morton E. Yohalem as his Special Deputy for Rubber Facilities Disposal. Mr. Yohalem, whose special field is corporate reorganizations, met June 9 and 10 with representatives of the rubber, petroleum, and chemical firms currently involved in synthetic rubber plant operations to begin the task of drawing up "ground rules" to govern disposal. This job, when completed, is expected to serve as the basis for the two disposal reports required by the Rubber Act next spring. Rubber Director L. E. Spencer said RFC is seeking to develop a plan that would put the plants up for open public bid.

The June 9 meeting, also attended by RFC Rubber Division officials, was with the operators of the 13 copolymer plants; while the June 10 meeting was held with the oil and chemical firms which operate the 11 butadiene plants. The June 9 meeting was the second held with the rubber committee.

Mr. Yohalem practiced law in New York before joining the staff of the Securities & Exchange Commission, from which he recently resigned after heading its Public Utilities Division for five years. Mr. MacDonald, chairman of SEC during most of that period, said that "tremendous strides were made" under the stewardship of Mr. Yohalem in the reorganization program required under the Holding Company Act. MacDonald said that Yohalem's "experience in the complicated problems involved in the disposition of more than $13 billion of properties in the electric and gas utility field should especially qualify him in coping with the complex problems of his new assignment."

MacDonald expressed the hope that "impetus will be given to the formulation of a report to the President and to the Congress of a satisfactory and workable program for disposition by the government to private enterprise of the vast facilities for the manufacture of synthetic rubber now being operated by private companies under government supervision." In developing the program, he said, he has "the cooperation and assistance of an Advisory Committee drawn from the top personnel of large and small producers and users of petroleum, chemical and rubber materials." MacDonald further declared that he "contemplates the cooperation and assistance of all other interested government agencies."

On June 6, Sen. Harley Kilgore (Dem., W. Va.) announced that the RFC Administrator had promised to hold up the closing of the Institute, W. Va., copolymer plant, the world's largest, pending a resurvey by RFC of that plant's facilities. RFC had ordered the plant closed down and put into standby status effective about July 1. For some months the plant, operated by The B. F. Goodrich Co., has been producing at a monthly rate of 6,000 long tons, two-thirds of capacity. It produces hot rubber only, according to RFC officials, and operates solely on alcohol butadiene.

Rubber Director Spencer said the shutdown was ordered partly out of these considerations, but primarily to bring GR-S output in line with decreased consumer demand. By knocking off 6,000 tons at Institute, the agency hoped to be able to maintain production at fairly high rates at all other copolymer facilities.

Closing down the high-cost Institute facility, as Mr. MacDonald said at a press conference on June 16, would be coupled with the closing down of the two alcohol butadiene facilities, at which production had been curtailed for some months. The Louisville, Ky., plant is scheduled for shutdown in July and the Kobuta, Pa., plant in September.

These moves would put GR-S output entirely on a petroleum basis, permitting

a reduction of production costs to about 20¢ a pound, possibly 19¢. Whether RFC would then abide by present policy and make a corresponding reduction in its selling price, reducing from the current 23¢ to about 20¢ a pound, is still to be determined. The matter is under consideration, MacDonald declared. He added that the State Department had asked him to consider the impact of future price action on the domestic economies on natural rubber producing nations and to keep the State Department advised on any prospective moves. State Department officials confirmed this statement, but added pointedly that they had gone no further and intend to leave the decision up to RFC.

"We are maintaining a strict hands-off attitude on this matter," one official said. He also reported that State and RFC made it abundantly clear to natural rubber producing nations at the May Ottawa meeting of the Rubber Study Group that the decision would be made by RFC alone.

Mr. McDonald, at his new conference, indicated that the ultimate decision may hinge on considerations other than the possible unfavorable impact on natural rubber prices. He said that the declining volume of RFC's rubber sales must be considered in determining the selling price of GR-S. Even though RFC is making a profit at the present price and volume, he said, this profit might disappear if natural rubber won a larger part of the market, forcing greater reductions in GR-S output.

As for closing the Institute copolymer plant, the order to shut down about July 1 had not been withdrawn by June 21. RFC promised only to resurvey the plant and began this resurvey immediately on receipt of Senator Kilgore's request for reconsideration.

RFC Rubber Figures

RFC said that it expects to produce 51,000 tons of GR-S in July and sell 51,000 tons. Government-held inventories are already at 75,000 tons and will not be increased unless demand falls below the 600,000-ton annual rate. In that eventuality RFC would be required gradually to step up its inventory accumulation toward 125,000 tons, attaining the latter when consumption fell to 450,000 tons a year. This procedure is stipulated by a Defense Production Administration directive announced several months ago.

The RFC production rate for June was set at 56,000 tons of GR-S and 5,000 tons of butyl. The former includes 27,370 tons of LTP GR-S (cold rubber), 11,262 tons of black masterbatch, 3,192 tons of oil masterbatch, 804 tons of oil-black masterbatch, and 3,966 tons of latex. Actual sales in May were 52,892.5 tons for GR-S and 6,212.2 tons for butyl. The former included 22,260.9 tons of LTP GR-S, 7,633.5 tons of black masterbatch, 3,758 tons of oil masterbatch, 1,062.5 tons of oil-black masterbatch, and 3,406.5 tons of latex. The components of the GR-S totals are not mutually exclusive.

May output of LTP GR-S was reduced as a result of petroleum industry strikes. Total GR-S output was maintained fairly well by increasing production somewhat of alcohol-based GR-S.

The United States Rubber Co. and Goodyear Synthetic Rubber Co. plants at Port Neches, Tex., resumed operations June 6, after a week's shutdown resulting from the petroleum industry strike, which had shut down their supplier, Neches Butane Co. The Goodyear plant at Houston, Tex., had also closed down only a few days earlier when its butadiene supplier, Sinclair Rubber, Inc., ran into a shortage of materials forcing a halt to butadiene production.

GSA Stockpile Rotation

GSA rubber officials shed a little light on the stockpile rotation program they intend to pursue after June 30, when complete private trading was restored for natural rubber.

Usually well-informed sources said that GSA will rotate some 25,000 tons of natural rubber, mostly off-grade browns and ambers, during the last half of the calendar year, going about it gradually, with relatively little to be rotated in July alone.

GSA officials said that it will take most of July to complete inventory on what rubber they have, and the likelihood is that no firm rotation program could be set up much before the end of August.

The agency, these officials said, will make every effort to replace off-grade rubber with specification rubber of like type and in the lower ranges of specification grades. While the stockpiling law does not require replacement by like grade, the agency intends to conduct its rotation program so as to keep to a minimum the up-grading of the stockpile.

Public Law 520—The Strategic and Critical Materials Act—will govern GSA rubber operations after June 30. In the previous 18 months GSA's operation was governed by the Defense Production Act, which contained no restrictions on selling rubber and required no replacement.

Under P. L. 520, which requires GSA to replace rotated stocks pound-for-pound, GSA is permitted to sell off-grades and require replacement with top-grade rubber, such as #1 RSS, but an official said, "We won't do that." What the agency plans to do, as far as possible, is to replace #4 amber with a #3 or #2, as one example.

Purchasers under the rotation program, it was reported, will be required to make replacement to GSA within 30 days.

Representatives of natural rubber producing nations for some weeks prior to June 30 were carrying their apprehensions over a possibly harsh rotation program to Washington officials, but apparently they have little to worry about in the immediate future. They were particularly concerned lest GSA dump vast quantities of off-grade rubber on the market, requiring its replacement with high-grades, such as smoked sheets. The market spread between low and high grades already is too wide for comfort, they believe, and any such move would further widen the price spread, further aggravating the economic problems of the smaller non-estate producers who turn out lower grades.

In addition to low-grade browns and ambers, it is likely that GSA may also rotate some flat bark and perhaps some of the high-grade smoked sheet taken over from RFC five years ago. It will be some weeks, however, officials have indicated, before they will be in a position to take stock of what rubber they will want to replace.

As for natural rubber latex, GSA announced June 11 that it had completely wiped out its inventory of that material, having come to agreement with consumers on that date to take title at 62.5¢ a pound to the remaining tonnages held by the government. Only about 400 tons were involved in the agreement, which saw all consumers pro-rate it among themselves on a historical usage pattern basis. The move was initiated by the rubber consuming industry, after individual companies proved reluctant to take over the last remaining tonnage, which contained much material of grades they were not anxious to buy.

As soon as the deal was completed, GSA announced that it had dropped the ban which prevented consumers from using any of the natural latex imported by private firms. Private imports, subject to GSA purchase permits, were authorized last December, and considerable tonnages were coming in at prices some 30% under the GSA selling price of 62.5¢ a pound. GSA lifted the ban blocking usage of this material effective June 11. On June 16 the NPA amended Rubber Order M-2, ending the requirement that private firms get GSA permits before importing natural latex. The amendment was effective June 16.

Reclaimers Complain

Leaders of the rubber reclaiming industry complained of discrimination against their product resulting from the government's current pricing policies for synthetic rubber, at a hearing June 5 before the Gillette Rubber Subcommittee of the Senate Small Business Committee.

Testifying before the subcommittee were J. H. Nesbit, president, U. S. Rubber Reclaiming Co., and chairman of the Rubber Reclaimers Association; William Welch, president, Midwest Reclaiming Co.; Benjamin M. Rosenthal, treasurer, Nearpara Rubber Co.; and Director Spencer of the Synthetic Rubber Division, RFC.

Mr. Nesbit raised the claim of discrimination in these words: "I, as well as other members of the industry, feel that we, as manufacturers of a comparable raw material, are being discriminated against by the fact that all-purpose synthetic rubber (GR-S), which is produced, distributed and financed by a governmental agency, is sold at a price which does not carry the same full burden of costs as would be required if this material was made in privately owned plants."

This claim of discrimination against a comparable raw material has also been heard, although not before a Senate committee, from natural rubber producers in recent months.

Mr. Welch and Mr. Nesbit both told the committee that reclaimers are not seeking a subsidy in any form, but desire only that synthetic rubber be priced by RFC to reflect all costs that would be encountered in private operation. Mr. Welch said that on the basis of recent conversations he had with Col. Bradley Dewey, the World War II Rubber Director, he [Mr. Welch] estimated that GR-S would have to be sold at from 28 to 31¢ a pound to cover all costs that would accrue under private operation.

Mr. Rosenthal told the committee that his firm has felt the impact of GR-S price competition primarily because Nearpara sells higher priced types of reclaim.

Mr. Nesbit said RFC does not pay city, state, or federal taxes, make dividend payments, or meet the costs of paying for salesmen, advertising, or promotion. It borrows money at low interest rates and sets aside only a fraction of the money which private firms put aside for administrative expenses, he added.

Mr. Spencer replied that RFC pays all state and municipal taxes, but does not pay income or excess profits taxes and local use taxes. The current selling price for GR-S, he said, covers full depreciation

as well as wage rates comparable to those paid by private industry. Mr. Spencer said that RFC operates entirely on borrowed capital, and the price of GR-S covers full interest on investment and working capital. The selling price, he noted, also includes 1¢ a pound set aside for contingencies. He estimated that RFC would make about $25 to $30 million in profit this year on its synthetic rubber operation.

The RFC official told the Senators that the agency's styrene purchase contracts, now negotiated on an annual basis, do not provide as favorable prices as were available on the long-term contracts which expired last February. Mr. Spencer did not deny, however, that RFC generally pays less for styrene than do other customers buying on the open market. He did say that styrene makers were not selling to RFC at a loss.

Tax Amortization Certificates

DPA announced June 19 that it has come to just about the end of the road in approving requests for rapid tax amortization certificates to expand production capacity. The agency issued a list of 115 materials, products, and facilities for which expansion goals have been established and 143 others for which goals soon will be established.

The agency cautioned industrial firms to consult first with the government agency concerned with that particular industry before going ahead with expansion plans requiring rapid tax amortization. DPA said that it will continue to issue a few certificates, but that these will be confined to special areas which, after careful screening, are found to require additional capacity for the defense mobilization program. Typical of such a case would be the need of a facility to break a bottleneck in production of military and defense supporting items, such as machinery. DPA is undertaking a survey of the companies already granted certificates of necessity, to determine whether they have been put to use. It is possible that in cases where certificates have gone unused, the agency would extend the certificate to another company.

Specific types of tires, horizontal wire braided hose, and miscellaneous rubber and rubber products were among the materials and products for which expansion goals have been set. So were carbon black, styrene monomer (including methyl styrene), butadiene, and vulcanized fiber. Non-cellulose synthetic fibers were listed as materials where expansion goals will be set.

DPA officials said that the goals for the 258 products or materials listed already have been filled, or applications are on hand in sufficient volume to supply the required expansion in most cases.

On the same day NPA officials told members of the agency's Carbon Black Industry Advisory Committee that 22 applications for tax amortization certificates for construction of carbon black facilities have been approved out of 31 filed. Of the balance, three have been withdrawn, one denied, one held in abeyance at the request of the applicant, and four were pending.

The approved applications would, by January 1, 1955, add 717 million pounds to the January 1, 1951 annual capacity of 1.52 billion pounds. The expansion goal is an additional 800 million pounds to 1951 capacity, or 83 million pounds shy of the amount approved to date. NPA said, however, that part of the goal will be attained through expansion projects unassisted by government tax write-off certificates. [See list below for recent tax amortization certificates granted for carbon black expansion—EDITOR.]

NPA also told the committee that progress is being made on building 110 special hopper cars needed to transport carbon black. To date 14 have been built, and once labor difficulties are settled, construction of the remaining cars will go forward at the rate of two a day, with completion of the program expected by the end of August. Settlement of the labor difficulties at the car building plant, NPA said, was expected to come before the end of June.

Exports of carbon black totaled 84 million pounds in the first quarter and amounted to 23.1 million pounds in April, when total U. S. output was 140.1 million pounds. Foreign output was estimated at between 170 and 180 million pounds annually, with Germany producing 88 million pounds in 1951. Capacity of the United Kingdom is 75 million pounds, and of Japan, 12.4 million pounds a year. The committee urged that a secret report by DPA on U. S. and world requirements for carbon black for all purposes, including use in making synthetic rubber, be made available to the industry.

Between May 20 and June 10, DPA announced that it had approved for rapid tax amortization the following new or expanded defense facilities involving rubber products or those closely related to the rubber industry. (Listed by company, location of facility, product or service, amount certified as defense expansion, and percentage of that amount to which rapid tax write-off may be applied in that order.)

Continental-Diamond Fibre Co., Bridgeport, Pa., vulcanized fibre sheets, $39,734, at 50%.

Stokes Molded Products, Inc., Trenton, N. J., hard rubber dust, $180,000 at 50%.

Raybestos-Manhattan, Inc., Passaic, N. J., rubber lining for equipment to produce defense materials $40,000 at 50%.

Nearpara Rubber Co., Trenton, reclaimed rubber, $258,516 at 60%.

Kelly-Springfield Tire Co., Cumberland, Md., military tires and tubes, $517,250 at 35%.

Consolidated Process Co. Inc., Indianapolis, Ind., hard rubber compound, $84,000 at 50%.

B. F. Goodrich Co., Miami, Okla., military tires, $542,059 at 25%.

G. A. Masites Co., Fort Worth, Tex., rubber and plastic linings for tanks, $48,169 at 50%.

Lee Engineering Co., Pawtucket, R. I., tire demounting machine, $93,500 at 50%.

Rohm & Haas, three separate applications for facilities to make plexiglas sheets for Armed Services at Knoxville, Tenn., $604,875, $50,500, and $105,250, all three at 80%; two applications for facilities to make ethyl and methyl acrylates for plexiglas sheets both at Deer Park, Tex., $7,465,734 at 40% and $4,791,703 at 80%; hydrogen cyanide for plexiglas sheets, $1,113,576 at 80%.

The following carbon black projects also were granted necessity certificates for rapid tax amortization:

Cabot Carbon Co., Bayou Sale, La., $370,650 at 50%; St. Mary Parish, La., $1,847,475 at 50%; Centerville, La., $1,097,475 at 50%.

Continental Carbon Co., near Hobbs, N. Mex., $1,010,500 at 50%; near Sunray, Tex., $185,000 at 50%.

United Carbon Co., St. Mary Parish, La., $2,655,500 at 50%; near Shamrock, Wheeler, Tex., $1,907,500.

Phillips Chemical Co., Borger, Tex., $479,500 at 50% and $2,395,900 at 50%.

Thermatomic Carbon Co., Sterlington, La., $985,110 at 50%.

June 6 M-2 Revision

NPA on June 6 amended Order M-2, taking three actions:

1. The ban on consumption of #3 pale crepe natural rubber in rubber products was revoked, effective June 6.
2. Purchasers of GR-S were permitted, beginning July 1, to take up to 70% of their quarterly GR-S purchases from RFC in the form of cold rubber. The previous limit was 50%, and the increase corresponds to RFC production plans, increasing the ratio of cold rubber output.
3. The percentage of high-tenacity rayon which may be used in rubber products was increased to 130% of the base-period usage, effective with the April-June quarter. The previous limit was 120%.

NPA Rubber Director E. D. Kelly said the ban on using #3 pale crepe was lifted because this grade no longer is being bought for the strategic stockpile and is in adequate supply. The restriction on using high-tenacity rayon was liberalized, he said, because production is being stepped up to an annual rate of 436 million pounds in the third quarter, 5% greater than previously anticipated.

On June 19, NPA issued Interpretation 2 to M-2, making clear that sole crepe rubber includes all grades of sole crepe as well as cuttings resulting from the trimming of slabs or sheets of sole crepe to size or shape. Sole crepe is defined by M-2 as dry natural rubber produced from pale crepe which has not been compounded, vulcanized, or physically attached to any product. Use of sole crepe is banned by M-2 in the manufacture of pneumatic tires, shoes, shoe soles, heels, welting, or wrappers. The Interpretation prohibits use of sole crepe cuttings for such purposes.

Tire Prices

OPS came up with some discouraging news for its Tire and Tube Manufacturers Industry Advisory Committee in June as regards the prospects for favorable action on that committee's request that tire and tube prices be removed from price control.

The industry committee filed a petition with OPS on February 26, seeking price decontrol on the ground that tire supplies were more than adequate to meet demand and that "free and normal competition" would safeguard the public against any sharp rise in tire prices.

Meeting with the committee on June 19, the OPS Rubber, Chemicals & Drug Division reported that it has been reviewing the industry's petition and collecting additional data on the subject. But, it said, "at the present moment, the evidence available to OPS does not support the existence of a material softness in current tire prices at the manufacturing level"; consequently the Division has been unable to concur in the industry's petition. The Division said it will confer with the industry committee at a later date on additional evidence to be submitted to back up the decontrol petition. Meanwhile the petition is still being studied by the OPS Committee for the Relaxation of Controls, which, since its establishment in early February, has been busy formulating objective standards for suspending price ceilings in the industrial field.

Another major matter discussed at this meeting was the "proper pricing" of the recently reintroduced second-line tire.

The National Association of Tire Dealers reported a few days later that OPS was disturbed by some industry pricing practices on the second-line tires.

The OPS Division met earlier in the week of June 16 with a subcommittee of its Natural Rubber Industry Advisory Committee to discuss what type of price control, if any, will be used to govern the natural rubber market after the government drops out as supplier to the industry on June 30. Officials reported that they discussed several alternate proposals, but came to no decision.

Many tire companies reduced the prices on truck tires and tubes from 2½ to 5½% in mid-June.

Tire Cord Situation

Rayon and nylon tire cord and fabric production continued to increase, reaching a new high of 88 million pounds during the first quarter of 1952. As this new record was set, the government continued to aid the construction of new manufacturing facilities promising even greater production records in the future.

First-quarter output of rayon and nylon tire cord and fabric surpassed the October-December, 1951, total by 6% and stood 13% above the production attained in the initial three months of 1951. On the other hand production of cotton tire cord and fabric declined to 60.5 million pounds in the first quarter of 1952, off 16% from the previous quarter and 8% from the like quarter of 1951, according to the Census Bureau figures released June 17. Nylon accounted for 1,291,000 pounds of the first-quarter output, dropping from 1,410,000 in the fourth quarter of 1951, and equaling the figure reported for the first quarter of that year. Although rayon tire cord and fabric output continued its uninterrupted climb, total tire cord and fabric output, at 148.5 million pounds in the first quarter, was off 7 million pounds from the last quarter of 1951, but topped the first quarter of 1951 by 5 million pounds.

Meanwhile NPA announced in June that it had approved construction of a $2,974,000 tire cord fabric plant by Firestone Tire & Rubber Co. at Lebanon, Tenn., but was withholding materials allotments to put up the plant pending settlement of the steel strike. The agency announced further allotments of controlled materials to a number of tire cord facilities on which construction had already been started. These included: American Enka Corp., Lowland, Tenn., high-tenacity rayon, $10,769,500; Goodyear Tire & Rubber Co., location not specified, weaving rayon fabrics, $2,879,417; Industrial Rayon Corp., Cleveland, O., rayon tire cord, $5,125,000, and Painesville, O., viscose rayon tire yarn, $7,899,250; and North American Mills, Childersboro, Ala., viscose rayon tire yarn, $23,566,636.

—A.J.K.

Other Industry News

RMA Seminar on Rubber Quality

As mentioned last month, RMA, in connection with the distribution of its new bulletin, "Type Descriptions and Packing Specifications for Natural Rubber," effective July 1, 1952, and the new RMA type samples for natural rubber, planned to organize future meetings in principal rubber goods manufacturing centers for the purpose of explaining the type samples, descriptions, packing specifications, and the advantages of the proper inspection of rubber.

In a letter "To All Rubber Manufacturers," under date of June 19, W. J. Sears, RMA vice president, announced some details of the program designed to "assist rubber manufacturers to get what they pay for in buying natural rubber."

Plans call for the RMA Seminar on Crude Rubber Quality, Packing & Inspection to be held in Akron, O., September 16 and 17; in Trenton, September 30 and October 1; in New York, N. Y., October 14 and 15; in Boston, Mass., October 21 and 22; in Chicago, Ill., November 18 and 19; and in Los Angeles, Calif., on December 2 and 3. The Seminar will be one day in length, but will be repeated the second day.

Sears' letter states that the program has been developed by the RMA Crude Rubber Committee, made up of company men who buy and grade and inspect rubber and know rubber quality.

Watching hundreds of thousands of tons of rubber flow into this country, the members of this committee know that a substantial majority of United States manufacturers are paying higher prices for their rubber than is warranted by the quality of the rubber delivered to them, it was added.

The excessive and unnecessary costs to industry of poor grading and packing and the penalties for poor inspection are borne by and large by the smaller manufacturer, since the larger firms maintain trained inspection staffs to protect them through dockside or factory inspection of all rubber purchased. This practice places the smaller company at a competitive disadvantage at the outset as far as its raw material costs are concerned, it was said.

It is the purpose of the RMA Crude Rubber Committee to outline a program which will enable manufacturers individually to correct this inequity. Members of the RMA Crude Rubber Committee will be on hand at the seminar to present papers on various aspects of quality, packing, RMA type samples, and contracts. Experienced New York dock inspectors will travel with the exhibit to demonstrate methods and to assist manufacturers and their agents with their specific problems.

Far Eastern grading and packing of natural rubber has been one of the industry's most serious problems since World War II. The committee is convinced that there will be no improvement until the industry insists on getting what it pays for by tightening up its buying and inspection procedures, Sears declared.

It is the committee's hope, for that reason, to encourage the widest possible participation by all rubber manufacturers in the quality and packing seminars, in the instructional lectures on dockside or factory inspection, and in the use of RMA-type sample booklets ond contracts, he said in conclusion.

Collyer on Rubber Cartels

Peoples of Far Eastern rubber-growing areas would be handicapped in their fight against Communism and retarded in their efforts to raise living standards if an international cartel in rubber were to be established, John L. Collyer, Goodrich president, told members of the National Association of Purchasing Agents in Atlantic City, N. J., in May.

"Leaders in certain nations believe that it may be possible to eliminate or reduce the uncertainties of rubber production, consumption and price through inter-governmental agreements. But, instead of restricting production we should make every effort to expand consumption. High prices restrict the use of rubber; low prices encourage its use," Collyer said.

Collyer declared that every attempt to interfere with the normal functioning of the free market for rubber has failed.

"Perhaps the most important long-range result of previous cartels was the great stimulus given to the search for materials that could replace rubber in essential products," Collyer said. "Interest was redoubled to find a satisfactory man-made rubber through creative research."

Collyer said the United States is now participating in inter-governmental commodity cartels which have never been submitted to Congress for ratification. He referred to the International Materials Conference, which he described as a mechanism which could be used to force a basic revision of the American competitive economy. He termed the IMC a "super cartel" and described it as a Controlled Materials Program on an international scale with all the defects inherent in all such schemes, including ultra-conservative estimates of production and varying degrees of overstatement of requirements.

Collyer endorsed Congressional legislation now being considered in Senate and House committees to limit the authority of the executive branch to participate in cartels.

Natural Rubber Bureau on Price

In its June issue of *Natural Rubber News*, the Natural Rubber Bureau, Washington, D. C., called for speedier action than could be accomplished by international commodity agreements to prevent the damage caused to the Malayan economy by the recent considerable drop in the price of natural rubber.

"If speedy action is not taken, we may find that, while we are worrying about Korea, Communism is making its most important advances in Southeast Asia," the Bureau said.

"The specific remedies which it seems important to us to take at the moment involve the restoration of confidence in Southeast Asia. It is not the policy of the United States Government to subsidize the synthetic rubber industry or to operate the synthetic rubber industry as an economic weapon designed to control the price of natural rubber," it was added.

The Bureau went on to say that the majority sentiment of the United States Government at the present time is against further price reduction for GR-S synthetic rubber.

"The Far East producing countries should be told publicly by officials of the United States Government what many representatives of the producing industry have been told privately, and that is that the welfare of Southeast Asia is a matter of genuine concern to the United States, and the United States has no intention of allowing Southeast Asia to slip behind the bamboo curtain," the Natural Rubber Bureau concluded.

Labor News

The United Rubber Workers of America, CIO, began talks with three of the Big Four rubber goods manufacturers, Goodrich, Firestone Tire & Rubber Co., and Goodyear Tire & Rubber Co., in June.

It was reported that the URWA would seek a wage increase of 20¢ an hour.

Besides the wage increase, the union will seek improved pensions and insurance programs, productivity pay increases, and other benefits.

There is some doubt that the Wage Stabilization Board will go along with the union on a 20¢-an-hour wage increase. It is possible that the WSB will approve the annual productivity factor in determining wage increases, which will mean the same thing, it was said.

In Canada, workers at Firestone Tire & Rubber Co. of Canada, Ltd., went on strike on June 3. The URWA union is insisting on a pension plan of $110 a month at age 65, a 20¢-an-hour wage increase, and other benefits.

At the Bowmanville, Ont., plant of Goodyear Tire & Rubber Co. of Canada, Ltd., a strike of 36 office workers kept that plant closed last month. Production workers refused to cross picket lines set up by the office workers. The latter are asking for a $35-a-month wage increase and check-off of union dues.

EAST

Changes by Cyanamid

American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y., has formed a sales service department for its industrial chemicals division. A. J. Campbell, general manager of the division, said that this move was taken in conjunction with a reorganization program which has already consolidated various functions in the district offices. The new department will provide trade reports, sales analyses, and complete order processing for the division's main office in New York. R. C. Sarfaty, formerly product supervisor for the division's heavy chemicals department, was appointed manager of the new sales service department. E. O. Heydt will be in charge of the trade record section, and A. L. Wycoff, Jr., will supervise the order processing section.

H. C. Little, director of employe relations, was named assistant to the president, but will remain in charge of employe relations.

L. R. Forrest has been transferred to the Warners plant, Linden, N. J., where he will serve as staff assistant to the works manager. Mr. Forrest, formerly with the industrial chemicals division's New York production department, will coordinate plant engineering and chemical engineering problems at Warners. He joined Cyanamid in 1929 as a chemical engineer in the production department.

A. H. Gower has been made assistant district manager of the Philadelphia and Baltimore districts of the industrial chemicals division. Dr. Gower was formerly a technical salesman for the division at the Boston office. Dr. Gower served with Connecticut Hard Rubber Co. before coming to Cyanamid in 1945.

Other appointments announced by Cyanamid include R. E. Sumner, manager of the textile resin department of Calco Chemical Division, to general manager of the industrial chemicals division, and C. F. Bonnet, production manager, to assistant general manager of the industrial chemicals division.

E. C. Medcalf has been named head of the Calco coal-tar chemicals department, succeeding the late Q. T. Dickinson. Mr. Medcalf will be in charge of the purchase and sale of coal-tar and light oil crudes. He came to Calco as a trainee in 1933 and shortly became a research chemist, then, successively, a group leader, assistant chief chemist and production superintendent of the coal-tar department, chief chemist in 1945, and vice chairman of chemicals department technical committees in January, 1950.

Bakelite Appointments

Bakelite Co., a division of Union Carbide & Carbon Corp., 260 Madison Ave., New York 16, N. Y., has made R. B. Lowe vice president in charge of engineering and construction, and R. K. Turner vice president in charge of production. Bakelite's expanding plant production programs necessitate these appointments.

Mr. Lowe will devote his full time to the direction of engineering and construction activities. He joined Bakelite in 1923 and has been vice president since 1944.

Mr. Turner joined Carbide & Carbon Chemicals Co., another Union Carbide division, in 1924 at Clendenin, W. Va. He was general superintendent for chemicals at South Charleston, W. Va., and since 1946 has been affiliated with the works management department in New York. Mr. Turner will be responsible for production activities at Bakelite plants in Bound Brook, N. J.; Bloomfield, N. J.; Ottawa, Ill.; Marietta, O.; Bath, Me.; Belleville, Ont., Canada; and the Halowax Products plant at Wyandotte, Mich.

Harvey D. Shannon has been named manager of the engineering and construction department at Bakelite. He joined the company in 1917 at the Perth Amboy, N. J., plant. As works manager since 1945, Mr. Shannon has been responsible for facilities at the six Bakelite plants.

Glenn L. Pitzer succeeds Mr. Shannon as works manager of Bakelite. He started with Carbide & Carbon in 1933 at South Charleston. In 1942 he was appointed superintendent of the Canadian Resins & Chemicals plant at Shawinigan Falls, P.Q. Since 1947, Mr. Pitzer has been in charge of all resin manufacturing operations of the Texas City, Tex., plant of Carbide & Carbon.

Albert E. Maibauer has been made assistant to the manager of the New York sales development group by Bakelite. He joined the company in 1925 and has served primarily in the sales and development departments. In his new capacity he will continue work on the development of fluorinated resins begun in 1947.

New York Quartermaster Procurement Agency, 111 E. 16th St., New York 3, N. Y., recently announced the awarding of the following contracts for: *adhesive tape*, to Sanette Mfg. Co., New Rochelle, N. Y., 12,586 rolls, $28,080; *tape*, Technical Tape Corp., Bronx, N. Y., 123,870 rolls, $87,260; *men's rubber overshoes*, Hood Rubber Co., Watertown, Mass., 5,490 pair, $19,087.50, United States Rubber Co., Naugatuck, Conn., 540 pair, $2,052, Bristol Mfg. Corp., Bristol, R. I., 13,554 pair, $49,270.88, Goodyear Rubber Co., Middletown, Conn., 10,944 pair, $36,869.28.

More Awards to Firestone

The "Voice of Firestone" radio-television program and the company's public relations activities were given a special award by Freedoms Foundation for their "outstanding contributions' to the American way of life. In making the award over a television program on WXEL, Akron, O., Kenneth D. Wells, president of the Foundation, emphasized the high cultural and patriotic plane upon which the company's radio program has been maintained for 24 consecutive years. W. D. Hines, director of public relations, Firestone Tire & Rubber Co., Akron, received the award on behalf of the company.

The highest honor of the Republic of Liberia has been conferred upon Harvey S. Firestone, Jr., board chairman, in recognition of the "salutary and beneficial effect" which the Firestone development in Liberia has had upon the life of that country. In presenting the Grand Band of the Order of the Star of Africa, Liberian Ambassador C. L. Simpson said that the Firestone activities "actually marked the beginning of genuine American interest in the natural resources of Liberia, and it also revolutionized its internal economy, for which the government and people of Liberia are most grateful."

The Firestone rubber plantations in Liberia produced 72,588,225 pounds of rubber in 1951. Today more than 80,000 acres are planted with rubber trees, and new land is being cleared and planted every year. The company, furthermore, encouraged more than 600 independent Liberian farmers to establish rubber plantations, giving them seeds and technical assistance. Last year these plantations produced 4,500,000 pounds of rubber. In operating its plantations, the company conducts practically all the services found in an American city of 50,000 inhabitants, including hospitals, clinics, dispensaries, nurses' training schools, schools for native children, telephone systems, hydroelectric plant, brick plant, woodworking and furniture establishments, machine shops, garages, and stores.

Opens Houston Office

The rubber chemicals division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has opened a sales office in Houston, Tex., under R. W. Malcolmson, who will cover the Southwest, handling sales and technical service for neoprene and the company's rubber chemicals. Mr. Malcolmson spent five years with Goodyear Tire & Rubber Co., Akron, O., before joining du Pont in 1947, where he has been engaged primarily in neoprene sales development.

Tranfers Export Sales

Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, O., last month announced that the export sales activities of its subsidiary, Kolker Chemical Works, Inc., have been transferred to Diamond's export sales division in New York. Kolker, acquired by Diamond in August, 1951, specializes in organic chemicals for agriculture and industry.

S. B. Honour, who handled export sales for Kolker, will continue in that capacity for Diamond, assisting S. S. Savage, director of export sales.

Lee T. Rosser

Seiberling Appointments

Lee T. Rosser, San Francisco district manager of Seiberling Rubber Co., Akron, O., has been elected vice president and assistant general manager of Seiberling Rubber Co. of Canada, Ltd., Toronto, Ont., to succeed the late H. W. Gregory.

W. H. Mason, manager of factory accounting for Seiberling in Akron, has been named secretary and treasurer of the Canadian firm.

Charles I. Hines was appointed San Francisco district manager, replacing Rosser; while A. L. Edgerton, a San Francisco district salesman, becomes truck tire sales representative for the district.

Rosser joined Seiberling in 1945 after previous service with The B. F. Goodrich Co. in all its tire sales divisions. He was in Seiberling's merchandising department before being named district manager in 1946.

Mason, a veteran of 26 years' service with Seiberling in Akron, worked in all divisions of the accounting department and was named factory accounting manager in 1942. He succeeds D. G. Richards, secretary-treasurer of Seiberling Canada for the past six years, who resigned to join another firm.

Edgerton has been with the company since 1928 as a general-line salesman and tractor tire representative in all West Coast districts. He has past experience as a salesman for the United States Rubber Co.

Clyde Reighard has been promoted to general foreman of the automobile floor mat department at Seiberling. Reighard, previously a foreman in the bead department, replaces John Lowry, resigned. A member of the traffic division of the Akron police department until he joined Seiberling in 1946, Reighard previously had worked at The B. F. Goodrich Co. He started at Seiberling as a maintenance dispatcher, six months later was promoted to foreman in the mat department, and later to foreman in the stock preparation and tire building divisions.

Cuts Tire and Tube Prices

Seiberling last month announced reductions ranging from 2.5-7.5% in truck tire prices and 5% in passenger and truck inner tubes in June. Truck tires of 7.50-20 8-ply size or smaller were reduced approximately 2.5% in price; those in sizes 7.00-20 10-ply, 7.50-20 10-ply, and 8.25-20 were reduced about 5%; and those of 9.00 cross-section and up were reduced about 7.5%. All passenger and truck inner tubes were cut 5% in price; while farm tractor tubes were reduced 7.5%. According to L. M. Seiberling, vice president in charge of sales, the price cuts reflect anticipated savings in the cost of natural rubber. Passenger tires, made with large amounts of synthetic rubber, were not affected by the price reductions.

Hoffman, Clare Promoted

Robert A. Stephens, director of research for C. K. Williams & Co., Easton, Pa., on June 19 announced the appointment of two assistant directors of research: Irwin C. Clare and Mark Hoffman.

Mr. Clare had served as chief chemist for Jones-Dabney and as general superintendent for Mahoning Paint & Oil Co. and for Baltimore Paint & Color Works. For 15 years he was with the Hercules Powder Co., part of the time as head of the evaluation division of the experiment station. During the past three years he has been chief of the paint section of the C. K. Williams research laboratory. In his new position Mr. Clare will supervise research on the application of pigments in paints, rubber, plastics, floor coverings, and allied lines.

Mr. Hoffman since 1933 in the production department of C. K. Williams & Co., has worked as an analytical and testing chemist and has been in charge of both quality and production control. More recently he has been assistant plant superintendent and chief plant chemist. Mr. Hoffman will have charge of the optical and physical laboratories as well as the chemical engineering section of the research department, engaged in developing new products and new processes.

Both Mr. Clare and Mr. Hoffman are active members of several working groups of ASTM Committee D-1 and have participated in Production Club studies.

Bassons Industries Corp., Bronx, N. Y. plastics fabricator, has appointed Sidney D. Yarm assistant to George Lubin, director of research. Mr. Yarm designed and prepared specifications for electromechanical equipment for the N. Y. Naval Shipyard for many years.

General Tire Changes

The appointment of A. R. Carr and J. A. Beckett to new executive positions in the sales organization of The General Tire & Rubber Co., Akron, O., was recently announced by Vice President Howard A. Bellows. Carr, former manager of Kraft system and special products sales, was promoted to manager of passenger tire sales; while Beckett, previously manager of construction and contractor tire sales, became manager of Kraft system sales.

Carr joined General in 1945 in charge of creative advertising, was named sales promotion manager in 1947, and became manager of Kraft system sales in 1950. Beckett has been with General since 1928 and, as head of the company's field service engineering department, is one of the industry's outstanding experts on tire maintenance and service.

In New Quarters

Hale & Kullgren, Inc., has moved to new quarters at 613 E. Tallmadge Ave., Akron, O., from its former offices in the First Federal Savings Bldg. The new building houses the company's engineering staff and drafting room on the first floor and has the administration and sales offices on the second floor. The move was made necessary by increases in personnel arising from an expansion in the company's work on new developments for the mill room, as well as Banbury mixer repair work. The taking on of the National Erie Corp. line also necessitated moving engineering, drafting, and sales personnel from Erie, Pa., to Akron. The firm was recently given a large contract for the building of a large plastics plant.

In addition to its machinery business, Hale & Kullgren has greatly expanded its industrial engineering department and is currently rebuilding mill rooms into the continuous flow type. This type of mill room embodies the pelletizing of raw materials such as rubbers and reclaims, and the automatic handling of these materials by pneumatic conveyors to the compound rooms where they are automatically weighed on to belts which carry the proper amount of each ingredient to the Banbury. After leaving the Banbury the stock is pelletized, cooled, and blown into movable bins which either feed special warming machines for tubing and calendering, or go to other compounding machines for a second mixing of the stock.

New Hale & Kullgren Quarters in Akron

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Zinc Oxide Anniversary

The American Process for making zinc oxide was developed just 100 years ago by the New Jersey Zinc Co., 160 Front St., New York 38, N. Y. Prior to this development zinc oxide had been made in France by the so-called French Process wherein metallic zinc was melted, heated to the boiling temperature, and the vapors burned to form the oxide. Upon study, it was decided that this process was too expensive for use in this country.

Following an extensive period of experimentation, New Jersey Zinc created a method of producing the oxide directly from zinc ore. In this, the American Process, zinc concentrates are mixed with coal and burned with a forced up-draft on perforated iron grates. By careful control of combustion, various types of zinc oxides are produced. The products of the furnacing operation are delivered by pipe lines and fans to collecting rooms or houses. Here the zinc oxide is collected by passing the gases through vertically suspended cloth filter tubes. After sampling and grading, the oxide is packed in paper bags for shipment. This is the method by which most of the zinc oxide produced in this country is made.

Acushnet Advances Two

Richard B. Young, for six years factory manager of the rubber division, Acushnet Process Co., New Bedford, Mass., has been moved to its sales staff as assistant sales manager, reporting to Karl P. Goodwin.

Thomas C. Weaver, assistant factory manager, has been elevated to the position of factory manager.

Mr. Young started with Acushnet in 1938 and spent considerable time in the various production and engineering departments of the plant, and in engineering was finally moved to the job of chief engineer. Next he advanced to plant superintendent and then factory manager. In 1951 he was transferred to the sales department.

Mr. Weaver began his rubber career at the Goodyear Tire & Rubber Co. in Akron in 1937. He spent 2½ years with the Goodyear engineering squadron and an equal length of time with the production squadron and then took over the position of sales manager with Sinclair-Collins Valve Co. In 1942 he joined Acushnet as chief engineer.

Russell Mfg. Co., Middletown, Conn., has been issued United States patent No. 2,584,825 on Rusco fused fabric brake lining, a completely new method of manufacturing brake lining. Strands of asbestos web are saturated and completely surrounded with a special frictional binder material. This mass is compressed under 300 tons of pressure to give a product having a density of 120 pounds per cubic foot and a tensile strength nearly 10 times that of conventional woven brake lining. The new lining is said not to absorb water, and frictional heat evaporates surface moisture to allow almost immediate braking recovery. Grabbing and fade are said to be reduced to a minimum. The patent was granted to Gustav Walters, vice president and research director, and H. Clifford Morton, assistant research director, and assigned to the company.

Research Groups to Merge

The research department of Sharples Chemicals, Inc., 123 S. Broad St., Philadelphia 9, Pa., will be integrated with the research and development division of the parent company, Pennsylvania Salt Mfg. Co., also of Philadelphia. According to W. A. LaLande, manager of Pennsalt's research division, this integration will occur between June 15 and September 15. In the meantime laboratory facilities at Whitemarsh Hall, the Pennsalt research center, are being extended considerably by the conversion of additional rooms to laboratories and the rearrangement of existing facilities to provide for both the addition of Sharples research personnel and the expansion of Pennsalt's facilities.

At the same time Dr. LaLande announced certain organizational changes to accompany the research integration. John F. Gall, currently supervisor of research, will become director of the inorganic research department and be responsible for work in surface chemistry, inorganic synthesis, electrochemistry, and high-temperature chemistry. John F. Olin, director of research for Sharples, will be the director of the organic research department. George McCoy, at present Pennsalt's organic group leader, will be assistant director under Dr. Olin; while T. E. Deger, Sharples assistant research director, will be administrative assistant director.

William M. Lee and Ford R. Lowdermilk, currently the supervisors of the product development and process engineering departments, respectively, will become directors of those departments. The analytical section will be given department status, with Paul A. Munter as supervisor. Charles E. Inman and F. E. Lawlor will be advanced to group leaders in the organic research department, and present group leaders in the Sharples chemicals research departments will continue as group leaders in the new organization.

Fire & Safety Conference

The RFC Safety & Fire Conference, held at Louisville, Ky., May 13-16, was attended by approximately 150 persons including plant managers, safety directors, and fire chiefs from most of the 29 plants in the government's synthetic rubber program. H. J. Foy, Jr., head of the Safety Section of the RFC's Synthetic Rubber Division, presided over the conference, and the opening address was delivered by J. E. Miller, assistant chief of the Division.

Hydraulic Press Mfg. Co., Mount Gilead, O., celebrated its seventy-fifth anniversary in June. To mark the occasion the company published a 36-page brochure, entitled "It Started With an Apple," which reviews its history and growth since its founding in 1877 to manufacture cider presses. The firm soon expanded into the manufacture of hydraulic presses for other industries. In 1926 the company introduced self-contained, all-hydraulic Fastraverse presses, and later went into the manufacture of pumps, valves, and controls specifically designed for heavy-duty press operation. In addition to a history of the firm, the brochure describes and illustrates the different lines of presses for the rubber, metal, and plastics industries; press components; plant facilities; and lists the officers and directors.

Tester for Elastic Fabric

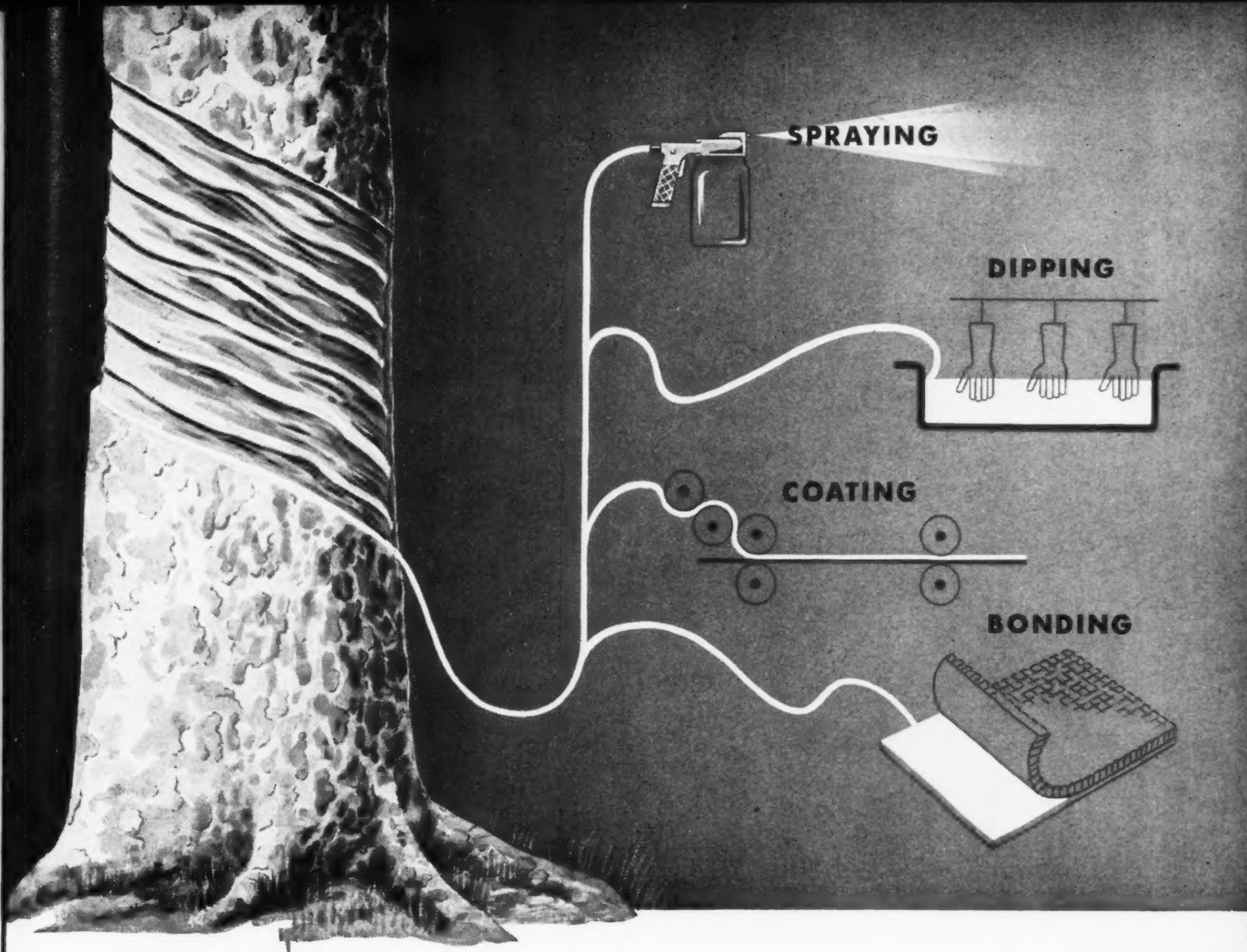
The Corset & Brassiere Association of America, 200 Fifth Ave., New York, N. Y., has announced the development and availability of a new testing apparatus for elastic fabric or webbing. The result of more than three years of work, the apparatus is designed to make possible the accurate comparative checking of elongation of elastic fabric or web against established standards. Known as the Charbert modulus tester, the apparatus was perfected by a special committee on testing procedures set up by the Association. Major credit for the equipment is due to H. J. Cunliffe, head of Charbert, Inc., through which the apparatus is now available to any manufacturer in the corset and brassiere industry.

Other members of the committee and the industrial trade groups they represented are: rubber thread manufacturers, H. E. Cooper, United States Rubber Co., and G. R. Keltie, Para Thread Co., Inc.; broadloom fabrics, Mr. Cunliffe, and Jack J. Feldman, H. Warshow & Sons, Inc.; webbing manufacturers, S. C. Lilley, United Elastic Corp., H. F. Lord, J. W. Wood Elastic Web Co., and Erl Pomeroy, Webbing Manufacturers Institute; dyeing and finishing, F. C. Dixon, Bradford Dyeing Association; and the Corset & Brassiere Association, H. S. Provost, Warner Bros. Co., Timothy Sullivan Treo Co., Inc.; and F. D. Dodge, Association president.

Plasticizer Program

Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass., has announced the availability of two new all-decyl plasticizers, Cabflex DDA (di-decyl adipate) and Cabflex DDP (di-decyl phthalate). The new materials are said to offer far lower volatility and greater permanence in vinyl compounds than is obtainable from presently available octyl phthalates, yet retain similar low-temperature properties. The introduction of the new plasticizers marks the start of a general overall expansion program by the company's plasticizers division. The program includes development of the production, sales, and research activities of the division and will make available at once greatly increased quantities of all currently produced Cabot plasticizers. The division is now expanding facilities and increasing its laboratory staff in an effort to keep pace with the growth of its technical service activities.

Wellco Shoe Corp., Waynesville, N. C., has announced a new development to eliminate occupational back-aches suffered by many clicking machine operators. Realizing that the back-aches were caused by the continual jarring and vibration of the machine platform on which the operator stands, Marvin Leatherwood, a Wellco clicking machine operator, designed and built a spring mounted platform which would act as a shock absorber during operation of the machine. The platform proved so successful that the management decided to provide similar platforms for the other operators. Patent applications on the spring mounted platform have been filed by the company in behalf of Mr. Leatherwood, and ready-made Leatherwood platforms will be placed on the industrial market as soon as manufacturing arrangements can be made.



First and finest in natural latex

—*it's Naugatuck*

Ever since Naugatuck Chemical made liquid natural rubber latex a practical material of industry, over 31 years ago, it has been the leader in the supply of fine latex.

Naugatuck latices are produced from selected trees on the world's largest rubber plantations, and are carefully controlled every step of the way to bring you purity and uniformity that is unexcelled. See data at right.

In addition, Naugatuck offers a completely integrated customer service, and specially compounds to meet your most exacting requirements.

For a *reliable* supply of the *finest* latex, for spraying, coating, dipping, bonding, or saturating, get in touch with Naugatuck Chemical today.

PROPERTIES OF *Naugatuck Chemical LATEX*

TYPE LATEX Average Values	"Centrifuged" NC 401	"Centrifuged" NC 957	"Creamed" NC 356	"Creamed" NC 403
Total Dry Solids Concentration	62.2	63.3	67.5	52.8
Mechanical Stability —seconds	1250	1550	1100	1750
KOH Number	.44	.41	.46	.83
pH	10.5	10.5	10.4	10.4
Ammonia	.7	.66	.6	.85
Viscosity—centipoises	33	35	30	33.5
Yield-point—cg/cm^2	1.3	1.1	2.0	4.4
Copper (on film)	less than .001%	less than .001%	less than .001%	less than .001%
Manganese (on film)	less than .0005%	less than .0005%	less than .0005%	less than .0005%

Testing Procedures used are those of the Crude Rubber Committee, Division of Rubber Chemistry, American Chemical Society.

Naugatuck Chemical Division of **United States Rubber Company**

137 ELM STREET, NAUGATUCK, CONNECTICUT

BRANCHES: Akron • Boston • Charlotte • Chicago • Los Angeles • New York • Philadelphia • Memphis

Rubber Chemicals • Aromatics • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices

Goodyear Assignments

Robert W. Richardson, since March, 1951, assistant to Vice President J. M. Linforth of Goodyear Tire & Rubber Co., Akron, O., left July 1 to assume the post of assistant to President E. S. Burke of Kelly-Springfield Tire Co., Cumberland, Md.

Richardson has been with Goodyear since 1934, when he joined the training squadron in Akron. During 1935 and 1936 he was employed in Goodyear Service Stores in Brooklyn, N. Y., and Boston, Mass., then returned to Akron in the company's mechanical goods sales department. He subsequently held sales positions with the mechanical goods division in Chicago and Buffalo. In 1941, Richardson was appointed district manager of the aviation products division at Dayton, O., and in 1944 returned to Akron as assistant manager of the mechanical goods department's manufacturers' sales organization. He served as manager of Goodyear's aviation products division from 1945 until his appointment as assistant to J. M. Linforth, vice president in charge of manufacturers' sales. In that capacity he has been charged with coordinating activities of aviation products and government sales and assisting Linforth in handling an increasing volume of government and aircraft business.

Establishment of a films, foam and flooring division, coordinating development, production, and sales of these products, with Joseph E. Mayl as general manager, was announced last month by Goodyear. Mr. Mayl continues as a vice president of the company.

Departments involved in the reorganization are Airfoam sales, under R. E. Pauley; Vinylfilm sales, under J. S. Bruskin; Pliofilm sales, under E. H. Dours; flooring sales (rubber and vinyl), under H. M. Evans; Airfoam and Pliofilm production, under C. H. Maxwell; Airfoam development, under G. H. Barnes; vinyl production, under G. H. Reynolds; and vinyl, Pliofilm, and flooring development under M. J. DeFrance.

Mr. Mayl joined the Goodyear organization in 1924 on truck tire sales, after having been directly associated with the rubber industry since 1911. In 1928 he was named manager of bus and truck tire sales; in 1929, manager of the southern division; in 1930, manager of all tire sales; in 1937, vice president of the California subsidiary, with headquarters in Los Angeles; in 1944, vice president and sales manager of the tire division in Akron; in 1949, vice president and sales coordinator for all Goodyear's products.

Walter J. Lee, assistant general manager of Goodyear's rim division, has been promoted to general manager of the division.

Joseph G. Swain, general manager of the division since 1933, will remain as consulting manager, retaining full and active interest in the division.

Hilton J. Lafaye, sales manager of the division, continues in that capacity.

Mr. Lee, who joined Goodyear in 1922, completed training in the Goodyear squadron in 1925, was transferred to tire design; was appointed assistant superintendent of the Goodyear-Java plant in 1937; was returned to Akron in 1939 to head the truck tire design department; in 1942 became technical contact man in the manufacturers' sales division; was Detroit resident engineer beginning a year later; and in April, 1951, was appointed assistant general manager of the rim division, Akron.

Mr. Lafaye came to Goodyear in 1935 as a salesman in the division and gradually was given greater responsibilities, until in April, 1951, he was advanced to the position of sales manager of the division.

Mr. Swain has been with the rim division since 1930 when he joined it as manager. He had been general superintendent of the St. Joseph, Mo., Railway & Light Co. from 1910 to 1913 and, from 1914 to 1918, general superintendent of the Northern Ohio Traction & Light Co. For the next 11 years, until 1929, he was vice president and general manager of Firestone Steel Products Co., Akron.

Terry L. Beals, technical service staffman with Goodyear since 1948, who recently completed a 90-day training course, left June 25 for Java where he will serve as manager of technical service at the firm's headquarters in Bogor. Prior to enrolling in the Akron training course, Beals had been assigned at Goodyear's plant in Jackson, Mich., the past three years in the technical service department.

George G. Hancock is now assistant district manager and retail supervisor in New York. For the past five years he was assistant district manager at Boston. He has been with Goodyear for 20 years.

George M. Riveire, assistant to the vice president in charge of Goodyear's Washington, D. C., offices, has been named a director of the Washington Post of the American Ordnance Associations and also vice president of the Washington Rubber Group. Riviere has been with Goodyear since 1919 and assumed his present duties in Washington in 1944. He was previously in charge of Goodyear's export offices in Washington and has served with Goodyear Export Co. in Mexico City, Puerto Rico, Spain, Manila, and Argentina.

E. E. Ellies, manager of the films and flooring department, resigned July 1 to become vice president and director of sales of Transparent Packaging Co., Inc., Chicago, Ill. Ellies, who during the past five years has become one of the leading authorities on transparent packaging, joined Goodyear in 1930 as a mechanical goods designer, was later assigned to flooring and molded goods development work, next was placed in charge of Airfoam development, and in 1941, in charge of fuel tank development. Five years later he was named manager of the company's chemical products division and in June, 1950, head of films and flooring.

St. Mary's Addition Operating

Goodyear's new million-dollar extruded rubber goods plant at St. Marys, O., is now in full operation. The sixth addition to the company's molded and extruded rubber goods manufacturing unit at St. Marys, the new plant was designed specifically for extruded goods. A variety of 200 products, ranging from auto window and windshield channeling to shock absorbers for 105 mm. artillery shells, is being made in the new plant.

Cuts Truck Tire Prices

Lower list prices on most types and sizes of Goodyear truck tires went into effect at the close of business on June 12. The reduction ranged from 2.5% on small truck tires to 7.5% on the larger sizes. All automobile and truck tubes were reduced by 5%, and farm tractor tubes by 7.5%. The price cuts stemmed from savings in the price for natural rubber.

Industrial Relations Forum

Representatives of 13 colleges and universities attended Goodyear's fourth annual industrial relations forum, held in Akron on June 10-20. The educators made a thorough study of Goodyear's industrial and public relations divisions and climaxed their research with a detailed report of their findings, which was presented to the company's top executive officers at the final session. The first four days of the program were devoted to presentations by 24 Goodyear executive and department representatives outlining their functions, with forum discussions after each series of presentations. The remaining days of the program were devoted to staff and factory studies by the educators, as well as motor tours, luncheons, and other social activities. Schools represented were Alabama Polytechnic Institute, Antioch College, Capital University, Carnegie Institute of Technology, Harvard University, Heidelberg College, Iowa State College, Kansas State College, Marietta College, Massachusetts Institute of Technology, Notre Dame, Purdue, and Wooster College.

Win Litchfield Awards

Four men judged Goodyear's best salesmen for 1951 were awarded the firm's highest sales honor, "The Litchfield Award of Merit," on June 5 by P. W. Litchfield, board chairman. Gold medals symbolizing the awards were given to James A. Loder, named "best wholesale salesman"; Dan A. Kingdon, designated "best large store manager"; Francis C. Craig, selected as "best small store manager"; and Thomas F. Porter, chosen as "best export salesman." In addition to salesmanship, the awards are also based on personality, demonstrated ability for leadership, loyalty, adaptability, and degree of development and improvement during the past year. Loder joined Goodyear in 1926 as a general-line salesman and has been manager of commercial sales since 1945. Kingdon won his honors while managing the company's store in Salt Lake City and is now assistant district manager at Los Angeles. He has been with Goodyear since 1944. Craig received his award for his work as store manager at Shenandoah, Pa., and has since been promoted to a similar post in Camden, N. J. He began his Goodyear career as a budget trainee in 1948. Porter's award was based on his work as field representative at Trinidad, and he has since been appointed manager of the miscellaneous products department in Brazil. He started with the company in 1947 as a sales trainee in the Near East and African division.

Goodyear Developments

Revolutionary modes of transportation may be the solution to the traffic and transit problems of our metropolitan centers, according to Col. Sidney H. Bingham, chairman of the Board of Transportation of the City of New York and transit consultant to cities throughout the world. In a brochure, "New Ideas for Efficient Passenger Transportation," Colonel Bingham states that the conveyor belt principle can be applied to underground transportation to give efficient and reliable service at costs for original equipment, installation, maintenance, and operation far below those required for our present underground railroad systems. A high-speed conveyor subway system designed by Goodyear and Stephens-Adamson Mfg. Co. as a replacement for the present 42nd St. shuttle in New York[1] is now being studied by Board of Transportation engineers.

Goodyear Vinylfilm, fabricated into long blankets by the Boland Mfg. Co., Winona, Minn., was recently pressed into service along the banks of the Upper Mississippi when it was feared that the swift current of the rapidly rising river would wash away the sandbag barricades. The long

[1] See our July, 1951, issue, p. 471.

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plastic blankets were draped over the dikes and, when the flood had subsided, were cleaned, rolled up, and placed in storage in case of future emergencies.

The world's largest ship installation of rubber flooring, covering almost 3½ miles of decks, passageways, and other passenger areas, was recently completed on the new luxury liner, the *SS United States*. Some 170,000 square feet of rubber, including 17,000 square feet of a specially molded marine blue deck tiling, and rubber sheeting in special color schemes, were produced by Goodyear in its plants at Akron and St. Marys for this installation. In all, nine different colors were employed in some 30 combinations of patterns.

Goodyear has installed test sections of conductive rubber heaters in the home dugout of the Cincinnati Reds at Crossley Field. Two wall panels made of conductive rubber and covered with insulating rubber have been installed on the back wall of the dugout. Each of these panels measures three by four feet and produces a temperature of 128° F. Two pads, each two by three feet and producing a 100° F. temperature, have been placed on the back of the players' bench.

Goodrich Developments

A new portable fuel supply "pipeline" has been developed by The B. F. Goodrich Co., Akron, O., in cooperation with the Engineer Research & Development Laboratories at Fort Belvoir, Va. Intended for delivery of gasoline and other liquid fuels to forward dispensing points, the new hose line can be laid from a vehicle at rates up to 15 miles an hour. One such hose line can transport 41 tons of material an hour, 24 hours a day, regardless of weather or road conditions. According to Goodrich, development of the pipeline required a new concept of hose manufacture, and equipment and methods were worked out for producing large-size hose in continuous long lengths. Made of synthetic rubber throughout, the hose is four inches in diameter, weighs less than one pound a foot, and has a bursting pressure of 500 pounds.

Freeze-resistant white rubber bands made by Goodrich are now available for use in packaging and storing food in refrigerators, home lockers, and deep-freeze units. Made of a special rubber compound, these bands can be used in temperatures as low as —30 to —40° F. and still retain their elasticity. Made in an assortment of popular sizes, the bands can be used for holding and sealing covers or wrappings on food packages.

The largest bullet-sealing fuel cells ever made are being manufactured by Goodrich for the giant Boeing XB-52 Stratofortress, the world's heaviest jet aircraft. Other Goodrich products used on the plant include specially designed magnesium wheels, expander tube brakes, and all-nylon aircraft tires. The plane's double-tandem main wheel tires measure 56 inches in height, have a 16-inch cross-section and a 32-ply rating, and are inflated at 240 pounds. Goodrich also furnishes the small outrigger wheels and tires near each wing tip.

Charles T. Wilson Co., Inc., 120 Wall St., New York 5, N. Y., last month announced the appointment of Renato A. Favenza as vice president and director; George H. Grenier as secretary and director; and J. H. Galletly, Jr., as treasurer.

F.M.S.I. Reelects

At the annual meeting of Friction Materials Standards Institute, Inc., 370 Lexington Ave., New York 17, N. Y., on June 18, the members reelected the following officers for the year starting June 1: president, Franklin A. Miller, Raybestos-Manhattan, Inc.; vice president, Frederick C. Weyburne, Marshall-Eclipse Division; treasurer, Vincent A. Spina, Scandinavia Belting Co.; secretary, Miss Harriet G. Duschek. Other members of the board of directors, serving with these officers, are: G. E. Ritter, Molded Materials Division; F. W. Barton, Reddaway Brake Lining Division; H. N. Wilhelm, RiteSet Mfg. Co.; L. Sullivan, Russell Mfg. Co.; D. H. Spicer, World Bestos Corp.

New MIIR Fellowship

Mellon Institute of Industrial Research, University of Pittsburgh, Pittsburgh 13, Pa., has announced the establishment of a fellowship for conducting systematic studies of standardization and its applications in science, engineering, production, and marketing. According to Institute President E. R. Weidlein, the fellowship will be sustained by a grant from the Sarah Mellon Scaife Foundation of Pittsburgh, and its projects will be organized and supervised by Dickson Reck, advisory fellow. Dr. Reck is lecturer in business administration at the University of California and has taught at the University of Pennsylvania. He has had wide experience in the field of industrial administration and standardization, headed the Standards Division of OPA early in World War II, and was recently an adviser to the American Standards Association.

DeBell & Richardson, Inc., Hazardville, Conn., has established a separate corporation, D&R Pilot Plants, Inc., for the pilot manufacture of plastic materials and products which have been developed in its laboratories. These pilot-plant operations, undertaken at the request of the company's clients, represent a departure from the regular laboratory work, and operating personnel familiar with the work have been transferred from the laboratories. Henry M. Richardson is president of the new corporation, and John M. DeBell is treasurer. DeBell & Richardson will continue to offer research and development service to the plastics industry without change of ownership or management.

Adamson-United Co., 730 Carroll St., Akron 4, O., has completed one of the largest vulcanizers ever constructed. The pressure vessel, measuring more than 45 feet in length, 15 feet in diameter, and weighing more than 150,000 pounds, was delivered to Goodyear Tire & Rubber Co. to be used in the production of airplane fuel cells of all sizes. According to Harold P. Lamb manager of project engineering for Adamson-United, the shell was built under sub-contract by Biggs Boiler Works of Akron; while work on the door and door flanges was done at the Adamson-United plant. The vulcanizer is designed to withstand an internal pressure of 100 pounds per square inch. The tank shell is 1⅛ inches thick; the head is 1⅜ inches thick; and the door weighs 47,000 pounds. The door is a slide type, operating vertically in a tower 35 feet high.

WEST

Dow Appointments

Robert E. Reinker has been named technical adviser to the president of Asahi-Dow, Ltd., recently formed associate of Dow Chemical International, Ltd., and the Asahi Chemical Industry Co., Ltd., of Japan.

The announcement was made by Clayton S. Shoemaker, president of Dow International, who said Reinker would be Dow International's representative in Japan and would figure prominently in the design, construction, and operation of facilities for the manufacture of saran by Asahi-Dow at Nebeoka.

Reinker has been superintendent of The Dow Chemical Co.'s saran polymer plant in Midland, Mich., for the past two years. He has been with Dow since 1942 and before entering the saran department was attached to the company's chemical engineering and physical research laboratories.

Concurrently Dow Chemical announced the appointment of Louis C. Friedrich, Jr., to replace Reinker as superintendent of the saran polymer plant at Midland. Friedrich has been with Dow since 1941 except for a four-year term of service in the Air Force. For the past year he has been superintendent of the company's saran plasticizer and vinyl chloride plants.

R. L. Curtis, general manager of Dow's western division, has announced the appointment of M. F. Ohman to the new post of assistant general manager of the division.

Ohman, the division's production manager for the past nine years, started with Dow in 1930 as a chemical engineer at Midland. In 1934 he moved to Long Beach, Calif., where he developed a new process for the reclamation of iodine from oilwell brines for the then Io-Dow Chemical Co., which was later joined with Dow's western division, and in 1941 he moved to Pittsburg as assistant plant superintendent. He will continue his headquarters at the Pittsburg plant.

Curtis also announced the advancement of H. H. Smith from assistant production manager to production manager of the division. Smith also began his Dow career in the Midland laboratories and moved to Los Angeles during the war as assistant manager of the government owned, Dow-operated styrene plant there. He later became manager of the styrene plant and in 1947 moved to Pittsburg as assistant production manager of the division.

Dow also reported that C. J. Strosacker, vice president and production manager of the plastics department, is relinquishing some of his duties to devote full time to saran fabrication plants and research laboratories. A pioneer of the company, Dr. Strosacker was made a superintendent of production in 1909, a production manager in 1915, a director of the firm in 1931, and a vice president in 1941.

As a result of the announcement, four members of the plastics department have been named to key positions by Mark E. Putnam, executive vice president. William H. Schuette has been promoted to manager of the newly formed plastics products department and will have under him Max Key as manager of saran production, Earl L. Collins as manager of polystyrene production, and Albert T. Maasberg as manager of cellulose products production.

After receiving his doctorate from Case School of Applied Science, Dr. Schuette joined Dow in 1941, became production

superintendent for styrene and other hydrocarbons in 1943, and was made assistant production manager of polystyrene in 1949. With the firm since 1928, Mr. Key was previously assistant production manager of saran and is a vice president and director of Asahi-Dow, Ltd. A 22-year employe of Dow, Mr. Collins was assistant superintendent of the polystyrene section for the past two years. Mr. Maasberg, assistant production manager of cellulose products since 1950, started with Dow in 1936.

The board of directors of Dow Chemical on July 1 increased its membership from 13 to 14 and named Carl E. Allen to the additional post. Mr. Allen is president of the Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.

Dow has appointed Parham Industries, Inc., Detroit, a Michigan area distributor for Styrofoam. The firm will also distribute the necessary accessories for proper installation of the material. Parham Industries is headed by Charles L. Parham, Jr., a veteran of 32 years in the insulation business.

New Plasticizers Station

Monsanto Chemical Co., St. Louis, Mo., has established a new plasticizers bulk station at Perth Amboy, N. J. The station, located to service the New York area by compartment tank truck, is the company's third. Other bulk stations are at Everett, Mass., and St. Louis. A fourth will be opened shortly at Akron, O. Purpose of these bulk stations is to enable plasticizers users to buy more than one of the company's wide range of plasticizers at the same time for compounding versatility and at tank truck prices.

New Vinyl Chloride Trade Name

Monsanto has given a new trade mark to resins and compounds of the vinyl chloride family. They are now known as Opalon. All vinyl chlorides were formerly classified as Ultron, but the new designation will simplify material specification and conform to the plastics industry's trend to more specific and more simplified terminology.

Vinyl chloride film and sheeting will still be referred to as Ultron.

Sokolofsky in Monsanto Post

Walter Sokolofsky has been appointed foundry service engineer for the plastics division at Springfield, Mass. He has been assigned to assisting foundries in developing the application of the new shell molding process. The plastics division is a manufacturer of phenolic resins for the process. Prior to joining Monsanto, Sokolofsky was employed for four years as a foundry metallurgist at the Saco-Lowell Shops and for two years as a chemist and metallurgist at the Warren Pipe & Foundry Corp.

Air Freight Reduction

Rate reductions of 23% on air freight shipments of rubber products between the Pacific Northwest and 14 inland and Atlantic Seaboard cities have been placed in effect by United Air Lines, Chicago, Ill. The new low rate applies to 1,000 pounds or more of rubber products flown by United to Seattle, Tacoma, and Portland from Denver, Chicago, Milwaukee, South Bend, Toledo, Akron, Cleveland, Detroit, Philadelphia, Newark, New York, Hartford, Providence, and Boston. On rubber products flown from Seattle, Tacoma, and Portland to the forenamed cities, the reduced rate applies to shipments of 100 pounds or more.

Zinke Company President

Arno L. Zinke has been elected president and a director of Mid-States Gummed Paper Co. to succeed the late Irving R. McHenry.

Also elected to the board of directors was Louis F. Weyand, St. Paul, Minn., executive vice president and director of Minnesota Mining & Mfg. Co. Mid-States is a wholly owned subsidiary of 3M.

Borg-Warner International, export trade division of Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill., recently announced the election of the following officers: president, J. W. DeLind, Jr. (reelected); vice presidents, L. G. Porter and Ray P. Johnson; treasurer, Robert A. Brown (formerly comptroller); and secretary, R. W. Dosé (reelected). Porter and Johnson are treasurer and administrative assistant to the president, respectively, of the parent company.

Marbon Corp., Gary, Ind., has appointed Anchor Chemical Co., Ltd., Manchester, England, exclusive world-wide distributor of all Marbon materials in all countries outside the United States and Canada. Anchor Chemical has served as sole world-wide distributor for Marbon's Ty-Ply rubber-to-metal adhesive since September, 1950, and now assumes the additional distributorship of Marbon's high styrene resins, 9200 paint chips, and 9200 paint resins.

David E. Williams has been named assistant sales manager of Goshen Rubber Co., Inc., Goshen, Ind. He was formerly assistant sales manager of the furniture and toy division of Hettrick Mfg. Co. Goshen manufactures a wide range of molded, die cut, and lathe cut rubber specialties, including O-rings.

Guayule Rubber

(*Continued from page* 517)

pure guayule truck tires, have reawakened interest in the rubber.

In the concluding portion of his talk Dr. Rands summarized the history and progress of the Department's cooperative research and development program on *Hevea* rubber, now under Point 4 auspices, in 11 Latin American countries. In addition to increasing the production of natural rubber in this hemisphere, the program is also aimed at improving the economic standards of these countries by encouraging small landholders to cultivate rubber. A major goal of the program is the development of disease resistant *Hevea* strains.

The election of Group officers for the coming year was held during the business session, and the following were elected: president, Norman Bekkedahl, National Bureau of Standards; vice president, George Riviere, Goodyear Tire & Rubber Co.; secretary, William J. McCarty, Synthetic Rubber Division, RFC; treasurer, Juan C. Montermoso, Office of the Quartermaster General; and recording secretary, Miss Ethel Levene, Bureau of Ships, Navy Department.

Waste Materials Course

LECTURES and plant visits on scrap metals, smelting, scrap rubber, waste paper and cotton, and wool rags were featured by the National Association of Waste Material Dealers, Inc., 271 Madison Ave., New York 19, N. Y., in its portion of a course for 70 Navy salvage and disposal officers from the East and the Midwest. The Association's portion of course was given at the Morrison Hotel, Chicago, Ill., on July 17 and 18. The balance of the one-week course was given by the Institute of Scrap Iron & Steel. The Association's program was arranged by Executive Vice President Clinton M. White, assisted by B. J. Feingold, Harold S. Brady Co., and included a talk on "The Scrap Rubber Industry" by Marvin Weintraub, H. Muehlstein & Co., Inc. A similar course for Pacific Coast officers is to be held at the Naval Training Center, Oakland, Calif., during the week of August 4.

Detroit Group Outing

THE Detroit Rubber & Plastics Group, Inc., held the largest and one of the most successful summer outings in its history on June 27 at the Forest Lake Country Club, Pontiac, Mich. Ideal weather prevailed, since a record breaking heat wave had ended one day before the outing, and the 350 members and guests attending enjoyed a day of golf and other sports. The outing concluded with a dinner in the evening, followed by the distribution of contest and over 50 door prizes.

Walter Melville, Briggs Mfg. Co., was the medalist in the golf tournament. Other golf prize winners were as follows: high gross, J. J. Merkel; closest to fourteenth hole, George Hovorka; longest drive on thirteenth hole, Al Chadwick; and blind bogey tournament, S. Clark, Jim Mortell, Gale Sharpe, S. Glaser, J. Clelland, Sam Tanney, and Harold Jacober. Baldwin Rubber Co. Walter Bauer, Brown Rubber Co., was general chairman for the outing and was assisted by a committee composed of Howard Neale, Pioneer Latex & Chemical Co.; John Craft, General Tire & Rubber Co.; Herb Hoerauf, United States Rubber Co.; Bob Chilton, Permalastic Products, Inc.; and George Wolf, Sharples Chemicals, Inc.

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SALES REPRESENTATIVES AND WAREHOUSE STOCKS: Akron Chemical Company, Akron, Ohio • Ernest Jacoby and Company, Boston, Mass. • Herron & Meyer of Chicago, Chicago, Ill. • H. M. Royal, Inc., Los Angeles, Calif. • H. M. Royal, Inc., Trenton, N. J. • In Canada: St. Lawrence Chemical Company, Ltd., Montreal and Toronto

NEWS ABOUT PEOPLE

William Knight Taft, manager of the synthetic rubber pilot plant, has been promoted to general manager of the Government Laboratories, operated for the Synthetic Rubber Division, Reconstruction Finance Corp., by the University of Akron, Akron, O. He succeeds James W. Schade, who retired July 1.

John Mason, Jr., has joined the Atlantic Research Corp., Alexandria, Va., to work in the electromechanical division. He had previously been with the Naval Research Laboratories, Washington, D. C.

William Talbot has been appointed manager of the plastic products division, Rubberset Co., Newark, N. J. Dr. Talbot is the inventor of melamine plastics and the author of numerous technical articles and patents. He will make his headquarters at the Newark plant, but extend his operations to cover the firm's Salisbury, Md., plant. Before joining Rubberset, Dr. Talbot was principal civilian scientist at the Army Chemical Corps' Dugway Proving Ground. He has been associated also with Sun Chemical Corp., the Stanford Research Institute, and Arthur D. Little, Inc.

Ernest L. Stephens, III, has been appointed sales representative in the Middle Atlantic area for The Bearfoot Sole Co., Inc., Wadsworth, O. With headquarters at 2603 Prospect Blvd., Reading, Pa., he will sell the entire Bearfoot line including Airflex Fibre soles and heels, neoprene crepe, and Nitrocrepe to shoe manufacturers in upstate New York, Pennsylvania, Maryland, and Virginia. Mr. Stephens has been identified with the shoe industry for several years, having been engaged in manufacturing prior to entering the service and after his discharge from the Army in 1946. More recently he was a manufacturer's agent representing suppliers to the shoe trade.

Harold V. Williams has been appointed manager of the process equipment department of Blaw-Knox Co., Pittsburgh, Pa., to succeed **Bruce Alexander**, transferred to the chemical plants division. A large-scale expansion and modernization of the process equipment department is now under way. Mr. Williams, with Blaw-Knox for 16 years, for the past year was manager of the Tulsa office of the chemical plants division. For some years before this assignment, he represented both the process equipment department and the chemical plants division as manager of the western sales department.

Dean Stockett Edmonds has been elected a director of Flexible Tubing Corp., Guilford, Conn. Mr. Edmonds is senior member of the patent law firm of Pennie, Edmonds, Morton, Barrows & Taylor and also is a prominent business leader, associated with many concerns including Farrand Optical Co. Flexible Tubing produces a complete line of industrial ducts and tubing using combinations of metal, woven fabrics, and rubber or plastics.

E. E. Moore, associated with the National Rubber Machinery Co., Akron, O., since 1928, has been appointed a member of the sales department of the rubber machinery division. He was formerly with the tire and tube mold division, with duties covering both engineering and sales.

Edward E. Zeilstra has been named technical director of Lloyd Mfg. Co., Inc., Warwick, R. I., and will have charge of material requirements, quality control, research, and development of new products. For the past five years Mr. Zeilstra was chief chemist of Carr Mfg. Corp. and during the war had served as chief rubber chemist and development engineer for the insulated wire and cable division of John A. Roeblings' Sons Co.

Gordon A. Ogden has been elected vice president of International Latex Corp., Dover, Del. Mr. Ogden joined the company in 1948 and since 1949 has been assistant to the president. Prior to his military service, Mr. Ogden was vice president of Alfred Dunhill of London, Inc., and Mary Dunhill, Inc. He was formerly general sales manager of Lady Esther, Inc.

Lester F. Cox has been elected executive vice president and executive manager of the Thermoid Co., Trenton, N. J. One year ago he was named senior vice president in charge of manufacturing and engineering for the company's seven plants. Now as executive manager he will supervise all divisions of the Thermoid Co., which manufactures rubber, friction, and textile products for the automotive and industrial markets. Mr. Cox has been with the company 22 years.

Maurice J. McCarthy has joined Hardesty & Co., New York, N. Y., as director of sales and will work in close cooperation with W. W. Fischer, recently appointed general manager. A veteran in the fat and oil industry, Mr. McCarthy was with A. Gross & Co. for 20 years as vice president and treasurer. Hardesty manufactures stearic acid, red oil, glycerine, and various fatty acids.

William T. Kiessling has joined Rubber Corp. of America, Brooklyn N. Y., as technical sales representative for the company's plasticizers. He was formerly with Hercules Powder Co.

Foreign Trade Opportunities

The firms and industries listed below recently expressed their interests in buying in the United States or in United States representations. Additional information concerning each import or export opportunity, including a World Trade Directory Report, is available to qualified United States firms and may be obtained upon inquiry from the Commercial Intelligence Unit of the United States Department of Commerce, Washington, D. C., or through its field offices, for $1 each. Interested United States companies should correspond directly with the concerns listed concerning any projected business arrangements.

Export Opportunities

H. J. Fortuijn, 49 Eindstraat, Drunen, N. B., Netherlands: interested in obtaining U. S. patents, processes, techniques, know-how, and machinery for the manufacture in the Netherlands of leather shoes with rubber soles; also interested in buying machinery used to adhere rubber soles without stitching with thread.

Paratex Corp., Ltd., Kotayem, Travancore-Cochin State, South India: ruber latex.

Import Opportunities

Manufacture de Caoutchouc Industriel—P. Lacellonge S. A., 50 Cours de la République, Villeurbanne (Rhone), France: anti-abrasive and anti-corrosive coatings.

F. C. Koch, 18 Esserstrasse, Hohenlimburg, Germany: wires and cables, resistance tapes, insulating material.

Lackfabrik Ludwig & Co., Finowstrasse 7, Berlin-Neukolln, Germany: "Unipas" color pastes for artificial resins.

Financial

Firestone Tire & Rubber Co., Akron, O. Six months to April 30, 1952: net profit, $19,018,905, equal to $4.81 a share, compared with $23,083,048 or $5.84 a share, a year earlier; sales, $465,187,866, against $448,307,918.

Viceroy Mfg. Co., Ltd., Toronto, Ont., Canada. Year ended February 29, 1952: net profit, $255,008, equal to $2.15 a share, compared with $244,569, or $2.07 a share, in the preceding fiscal year.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
American Hard Rubber Co.	New Pfd.	$0.87½	June 30	June 24
Baldwin Rubber Co.	Com.	0.15 q.	July 25	July 15
		Stock 10%	July 31	July 15
Dayton Rubber Co.	Com.	0.50	July 25	July 10
	Cl. A.	0.50 q.	July 25	July 10
Dewey & Almy Chemical Mo.	Com.	0.15	June 20	June 10
Endicott Johnson Corp.	Com.	0.40 q.	July 1	June 17
	4% Pfd.	1.00 q.	July 1	June 17
General Tire & Rubber Co.	4½% Pfd.	1.06¼ q.	June 30	June 20
	3¾% Pfd.	0.93¾ q.	June 30	June 20
	3¼% 2nd Cv. Pfd.	0.81¼ q.	June 30	June 20
Goodall Rubber Co.	Com.	0.15 q.	Aug. 1	Aug. 15
Goodyear Tire & Rubber Co. of Canada Ltd.	Com.	1.00	June 30	June 10
	4% Pfd.	0.50 q.	July 31	July 10
Jenkins Bros.	Non.-Vot. Com.	0.25	June 27	June 20
	Fdrs. Com.	1.00	June 27	June 20
I. B. Kleinert Rubber Co.	Com.	0.25	June 12	June 2
Mansfield Tire & Rubber Co.	Com.	0.40 q.	June 20	June 10
U. S. Rubber Reclaiming Co.	Pfd.	0.35 q.	July 1	June 20
Whitehead Bros. Rubber Co.	Com.	0.15 q.	Aug. 15	Aug. 1

Now you can buy precision molding and high surface finish by the drum! And what's more, those drums of Dow Corning Silicone mold lubricants also reduce scrap to the vanishing point—cut your mold maintenance costs by as much as 80%. Clean molds stay cleaner longer and you get easier release of tires and parts with uniformly sharp detail and a high surface finish, free from blemishes, inside and out.

That's why pressmen, production managers, quality control and sales departments all call for Dow Corning Silicone release agents; Emulsions for molds and curing bags; Mold Release Fluid in a solvent solution for green carcasses and for bead and parting line release.

For more information call our nearest branch office or write for data sheet M-19

For Better Quality **SPECIFY DOW CORNING SILICONE MOLD RELEASE AGENTS**

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OBITUARY

Thomas N. D. Mace

Thomas N. D. Mace

THOMAS N. D. MACE., vice president of Pequanoc Rubber Co., Butler, N. J., succumbed to a heart attack at his home in Butler on June 16.

Born in England 54 years ago, Mr. Mace came to the United States when he was six years old, but at the outbreak of World War I returned to England to serve in the British Army.

He came to this country at the end of the war, and began his career at Farrel-Birmingham Co., Ansonia, Conn. In 1926 the deceased started with Pequanoc as a mechanical engineer, became assistant superintendent of that company several years later, and in 1939 became superintendent. He became the firm's third president in April, 1949, but resigned that position the same year because of ill health, still maintaining, however, his post of vice president in charge of production.

Active in civic affairs in his home town, Thomas Mace served on the Borough Council of Butler for six years and was elected mayor three times.

A wife and a daughter survive.

George F. Wing

GEORGE F. WING, secretary and director of Charles T. Wilson & Co., Inc., 120 Wall St., New York, N. Y., died of a heart attack May 4.

Joining the Wilson company April 17, 1919, as a cashier, Wing successively became assistant treasurer, treasurer, and finally secretary and director.

Born December 10, 1893, in Brooklyn, N. Y., the deceased was a member of the American Legion, Crude Rubber Credit Association, and the New York Credit & Financial Management Association.

Funeral services took place May 6 at Garden City, L. I., followed by interment the next day at Cypress Hills, also in Long Island.

Survivors include the widow and two daughters.

Tom Gregory

TOM GREGORY, for 22 years editor for *The Oak Leaf*, house organ of Oak Rubber Co., Ravenna, O., and a widely recognized personality in the advertising field, suffered a heart attack last December, which finally resulted in his death on May 16 at his home in Lakewood, O.

A graduate of Central High School, Akron, O., the deceased worked successively for the *Akron Press*, Diamond Rubber Co., and Gregory Rubber Co., which was owned by his father. After leaving that company he went into business for himself, specializing in circus balloon advertising.

An ardent circus lover, Mr. Gregory was at one time president of the Circus Fans Association of America.

He was born in Akron, 67 years ago.

Besides his wife, Tom Gregory* leaves two daughters and two sisters.

Funeral services were held May 19 in the Saxon Funeral Home, Cleveland, O.

Karl K. Kantzer

KARL K. KANTZER, 63, Pacific Coast manager for the associated lines division of The B. F. Goodrich Co., Akron, O., since 1928, died June 6 in a Pasadena, Calif., hospital.

Born in Lakeville, O., Kantzer had been with Goodrich for 42 years, starting as a tire adjuster in the Akron plant in March, 1910.

Surviving are the widow, two sons, and two grandchildren.

Daniel Hanawalt

AFTER an illness of two months, Daniel R. Hanawalt, 91, a founder of India Tire & Rubber Co., Magadore, O., died at his home in Akron, O., on June 16.

For many years the deceased had been employed by Eastern Talc Co., supplying the rubber industry with soapstone before the first World War. Later on he worked for himself, as a sales representative for metal working and wood working machinery manufacturers. During the Twenties he began his association with India Tire.

A native of Mifflin County, Pa., Mr. Hanawalt was active in both the Church of the Brethren and West Congregational Church, having been a trustee and Sunday school teacher of the latter.

Survivors include his wife, two sons, a daughter, and six grandchildren.

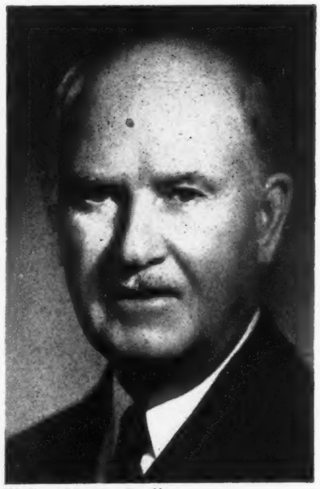
Funeral services and burial took place June 19 at Spring Run Church, McVeytown, Pa.

John A. MacMillan

JOHN ALWYN MacMILLAN, director and former president and chairman of the board of Dayton Rubber Co., Dayton, O., died June 7 after an illness of several years.

Born on a farm on Prince Edward Island, Canada, November 16, 1872, Mr. MacMillan was educated in the public schools there, and the Prince of Wales College. Later he began his career as a school teacher on the island.

He moved to Denver, Colo., and lived there 15 years, during which time he was



Wallace-Martin Studios

John A. MacMillan

associate general manager of the Equitable Life Insurance Society of the U. S., and was also affiliated with two large real estate concerns.

A pioneer in the rubber industry, and instrumental in the development of airless and low-pressure pneumatic tires and fans and belts for automobiles and power machinery, Mr. MacMillan moved to Dayton in 1908; he joined Dayton Rubber, bringing with him his airless tire invention and thus started the company in the manufacture of tires. Mr. MacMillan became general manager and president of Dayton in 1916 and held that office until 1936 when he was elected chairman of the board; he retained that post until 1945. He was also a director of the company and continued as such until his death.

A director of several civic and national organizations, and at one time president and treasurer of the Second St. Properties Co., the deceased also had been president of the Dayton Chamber of Commerce, a director of the Ohio Chamber of Commerce, the National Association of Manufacturers, the Miami Valley Hospital, the Dayton YMCA, Dayton War and Community Chest, National Junior Achievement, Inc., and the Ohio Expenditure Council. He was also a member of the Canadian Engineers Club of New York, the Dayton Country Club, and a former president of the Dayton Rotary Club.

His wife survives.

Funeral services were held at his home on June 10.

Trade Lists Available

The Commercial Intelligence Division recently published the following trade lists, of which mimeographed copies may be obtained by firms domiciled in the United States from this Division and from Department of Commerce Field Offices. The price is $1 a list for each country.

Automotive Product Manufacturers—Denmark; India; Uruguay.

Automotive Vehicle & Equipment Importers & Dealers—Algeria; Luxembourg; Mozambique; Nicaragua.

Boot & Shoe Importers & Dealers—Cuba.

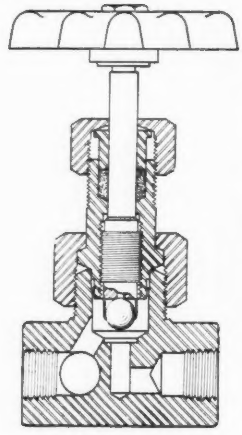
Chemical Importers & Dealers—Portugal.

Electrical Supply & Equipment Importers & Dealers—Barbados.

Tire Retreaders, Recappers & Repairers—Greece.

New Machines and Appliances

New Ball Valve



Cross-Sectional Drawing of Foxboro Ball Valve in Globe-Type, Two-Connection Design

A NEW 1/4-inch ball value of unique construction, recommended for working pressures up to 3,000 psi., has been announced by Foxboro Co., Foxboro, Mass. Tight, positive shut-off is provided by a stainless-steel ball which closes into a machined conical seat. The ball, retained at the end of the stem, is free-rolling so that every closing brings a new surface into contact with the valve seat. Alinement of the ball to the seat is accurately guided by a steel, union-type bonnet which fits tightly to the body and assures correct valve closure.

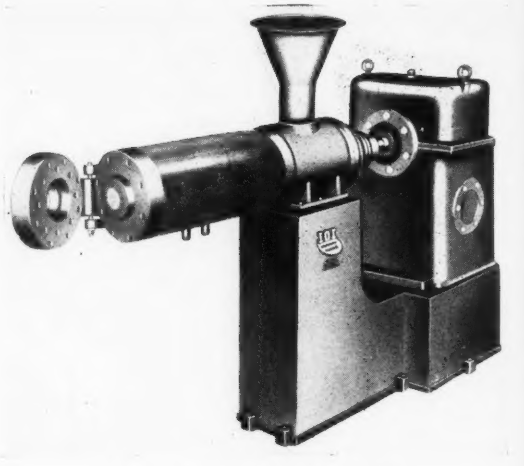
The long-stroke stem and the packing gland are made of stainless steel for durability and corrosion resistance. The preformed graphited asbestos packing has a plastic binder and can easily be replaced without shutting off the line pressure of interrupting the process. Both straight- and angle-type valves are available with either two or four connections to meet a wide range of industrial requirements. Universally adaptable for liquid, gas, and steam service applications, the new valve is especially useful on meter manifolds, gage lines, seal chambers, bleed-off connections, sampling connections, and lubricator shut-offs.

Rubber and Plastics Extruders

A NEW series of rubber and plastics extruders designed for higher production and better quality at lower cost has been announced by Allen Extrusion Machine Division, Industrial Ovens, Inc., 13825 Triskett Rd., Cleveland 11, O. When used in conjunction with the company's high-speed, integrated constant-tension handling equipment, the extruders provide a degree of process control not found in ordinary machinery.

The plastics extruders are made in two sizes, having screw diameters of $3\frac{1}{2}$ and six inches. Construction and design fea-

SEE PAGE 450



3½-Inch Allen Plastics Extruder

tures include heavy plate base for rigidity and strength; all drives and gear reducer housing mounted in one base unit; hardened, corrosion resistant screws of either the single- or double-flight type, and bored and fitted for liquid cooling or heating; main housings of heavy cast-alloy; driving spindles made of steel forgings; drives of the double reduction type with continuous herring-bone gears or heavy-duty worm gear drives; all thrust bearings of the roller type; heads hinged to main cylinder for easy maintenance, inspection, and screen changes; heads that may be fastened by a bolted, lever operated breech lock, or by cam or gear operated opening mechanisms; extruders designed for either right- or left-hand drive; heating elements that may be steam, oil, or electric; and machines readily adaptable to film extruding, wire covering, tubular shapes, and profiles. The 3½-inch extruder is 99 inches long, 30 inches wide, 50 inches high, and weighs 5,100 pounds. The six-inch machine is 147 inches long, 49 inches wide, 56 inches high, and weighs 13,000 pounds.

Rubber extruders are made in two sizes, having screw diameters of 4½ and 10 inches. Features of these machines include extrusion and feed chambers designed to eliminate entrapped air; interchangeable heads to permit quick conversion to straining operations; screw flutes designed for maximum stock delivery with minimum horsepower use; screws removable from driving spindle without dismantling the complete unit; cast-alloy thrust housings; forged steel thrust sleeves; heavy fabricated plate base; heavy-duty, oversized roller thrust bearings; and designed for either right- or left-hand drives. The 4½-inch extruder is 86½ inches long, 43 inches wide, 54 inches high, and weighs 7,000 pounds. The 10-inch machine is 132 inches long, 66 inches wide, 62 inches high, and weighs 15,000 pounds.

Both the rubber and plastics extruders can be furnished with special screw designs and with a wide range of die heads and other accessories.

Hydraulic Press

AN EXTENSION of its line of hydraulic slab-side molding presses, a new 48- by 48-inch model, has been announced by Stewart Bolling & Co., Inc., 3190 E. 65th St., Cleveland 27, O. The new press is of 1,000 tons capacity, has a 36-inch ram, can be made with a stroke of 18, 24, or 30 inches, has three-inch thick heated platens, and can be furnished with a range of openings as required. The new machine is said to be especially useful for slab sole work and for polishing sheet material.

New Bolling Slab-Side Molding Press

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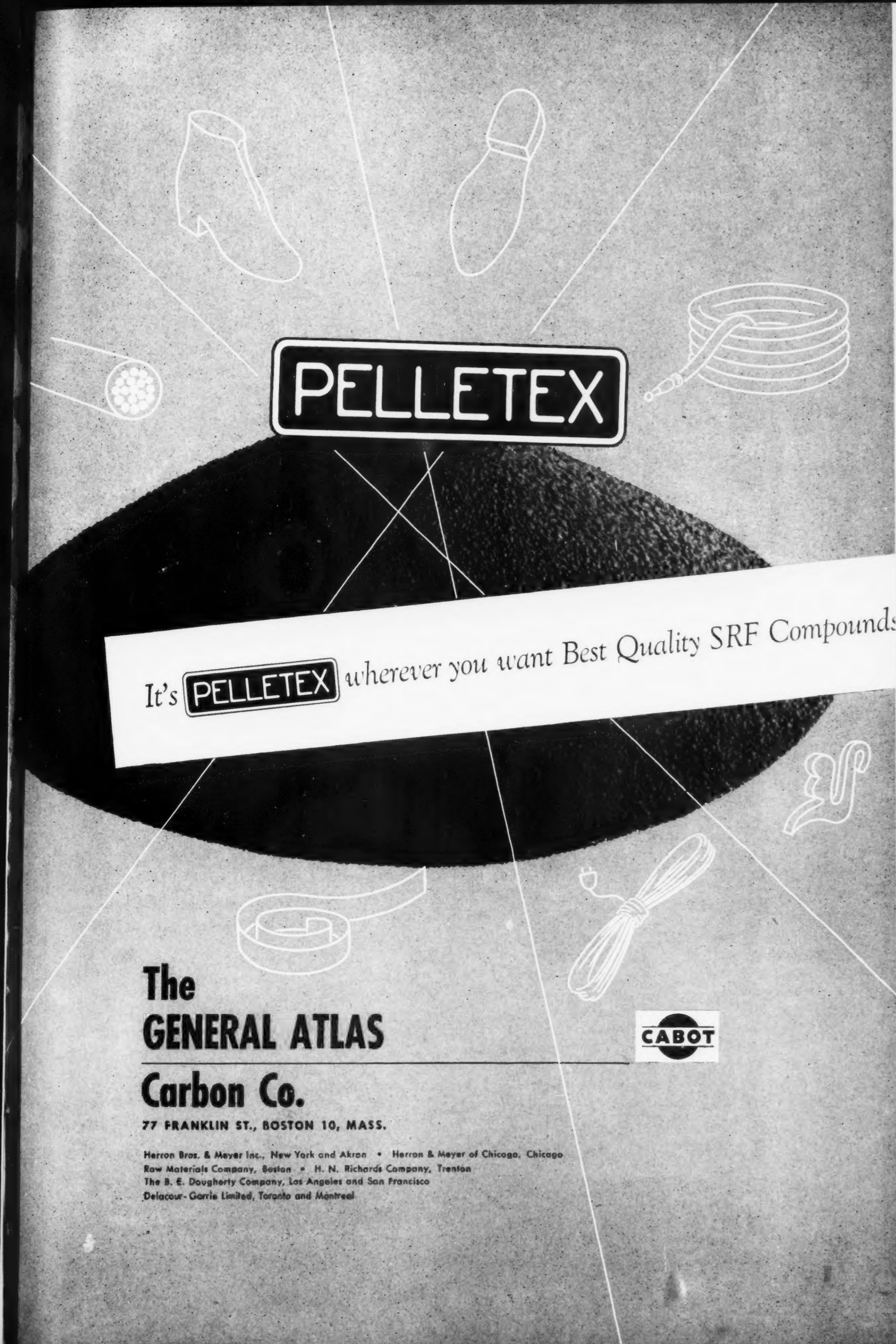
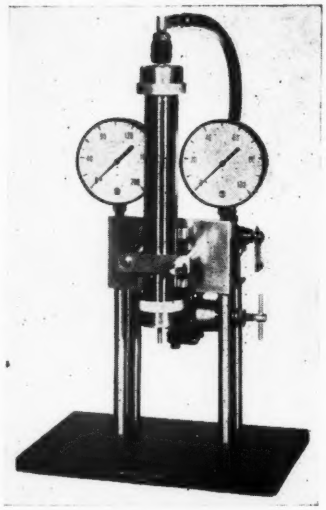

PELLETEX
It's PELLETEX wherever you want Best Quality SRF Compounds
The
GENERAL ATLAS
Carbon Co.
77 FRANKLIN ST., BOSTON 10, MASS.
Herron Bros. & Meyer Inc., New York and Akron • Herron & Meyer of Chicago, Chicago
Raw Materials Company, Boston • H. N. Richards Company, Trenton
The B. E. Dougherty Company, Los Angeles and San Francisco
Delacour-Gorrie Limited, Toronto and Montreal
CABOT

New Viscosity Cup



Severs Extrusion Rheometer for Viscosity Measurements

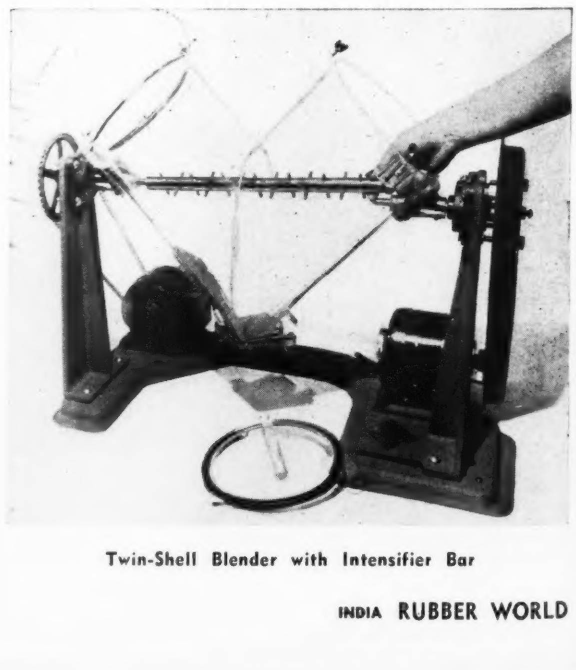
A NEW pressurized viscosity cup which permits greater accuracy and latitude in viscosity studies has been developed as a result of research on Vinylite dispersions by the laboratories of Union Carbide & Carbon Corp. Being made by Castor Laboratory Equipment Co., Pittsburgh, Pa., the cup is fast, accurate, simple to operate, and especially suited for use with plastisols, organosols, mill pastes, inks, greases, and dispersions.

Designated the Severs extrusion rheometer, the instrument measures viscosities in terms of pressure, quantity, time, and orifice size. Various orifice sizes are available, and operating pressures range from 0-100 psi. High-pressure models operating up to 3,000 psi., and jacketed models for accurate temperature control may also be obtained. The instrument has been designed so that it can be dismantled for cleaning in less than 10 seconds.

Improved Twin-Shell Blender

TWIN-SHELL blenders equipped with a newly designed rotating intensifier bar are being offered by Patterson-Kelley Co., Inc., East Stroudsburg, Pa. The lug-studded intensifier bar improves mixing action by effectively breaking up lumps, dispersing materials which tend to agglomerate, and homogenizing liquids into solid mixes. The bar is so located that the cylindrical lugs act only on the top layer of the material being mixed. Rotation of the blender continuously supplies fresh material to the impact and shearing action of the lugs whose peripheral speed is approximately 2,500 feet a minute.

The metal bar, belt driven by a separate motor, is easily removed for cleaning. It is currently available on all units up to the 60-cubic-foot size. The blenders themselves are furnished in both steel and acrylic plastic constructions. They operate on a mixing principle that combines tumbling action, transverse movement within the material, and a folding action.



Twin-Shell Blender with Intensifier Bar

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VORLD

New Goods and Specialties

Sky-Hiker Leather Shoes with Vulcanized Foamtread Soles

Shoes with Vulcanized Foam Soles

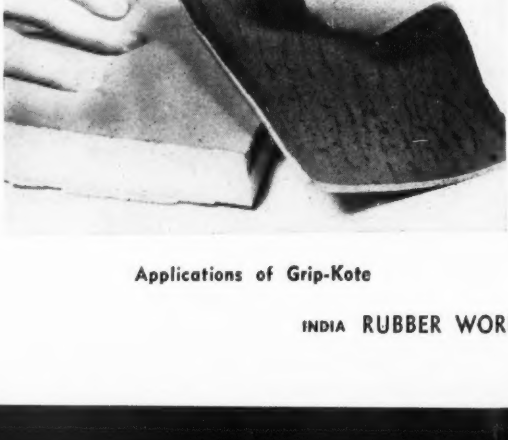
WELLCO SHOE CORP., Waynesville, N. C., is the first American firm to manufacture shoes having Foamtread soles vulcanized directly to smooth leather uppers. Made under patents owned by Ro-Search, Inc., also of Waynesville, the new shoes are the first to be presented to the domestic market, although similar shoes under the Ro-Search patent have been made in foreign countries.

Since the Foamtread sole is vulcanized directly to the shoe upper, no welt seams are required, and the construction does not use any tacks, wires, or other metals. The sole is reinforced around the edges with extruded rubber by a patented process that forms a positive bond. The counter and the toe cap are formed to shape on the last during the manufacturing process, thereby providing a flexibility not possible in premolded methods. Since there are no seams at the welt, a waterproof bond is obtained. The new line of men's shoes, to be sold under the name Sky-Hikers, also features a built-in arch support cushion.

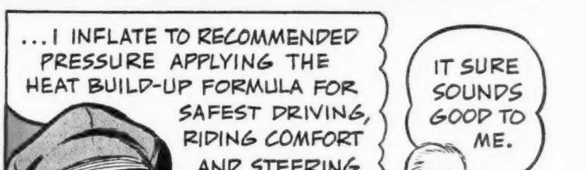
Coating for Sponge Rubber

AFTER more than five years of laboratory research Adhesive Products Corp., New York, N. Y., is now marketing a new rubber-base coating compound for foam and sponge rubber. This new product, trade named Grip-Kote, gives the cellular rubber a layer of durable rubber said to be tough, elastic, and attractive. The manufacturer also claims that laboratory "pull-tests" show that this coating becomes integrated with the foam or sponge on application.

Other cited advantages for Grip-Kote follow. Application to the foam or sponge base is quite simple and requires no special training or skill on the part of the operator. Thickness, elasticity flexibility, etc., can be varied to suit the requirements of the individual manufacturer and the end-use of the material being coated. The compound will not chip under die-cutting, can be



Applications of Grip-Kote



And it sounds good to the many dealers who are now using Certified Air Service as part of their regular procedures . . . and it helps them service and sell tires. This is but one example of the service behind Schrader Tire Valve Equipment that extends right down to the car owner.

Have you seen a copy of the Certified Air Service procedure manual? Write for Manual E-200.

A. SCHRADER'S SON, 470 VANDERBILT AVE., BROOKLYN 17, N. Y.
Division of Scovill Manufacturing Company, Incorporated

Schrader
REG U S PAT OFF

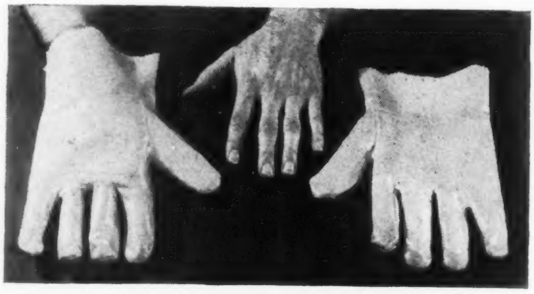
FIRST NAME IN TIRE VALVES

FOR ORIGINAL EQUIPMENT AND REPLACEMENT

applied to either the skin or the open face of the foam, and dries to the touch in 30 minutes, which time can be reduced to three minutes with the aid of infrared lamps or drying tunnels.

Grip-Kote can be made in any color or combination of colors and in a variety of textures. It can, moreover, be applied to individual articles or to whole sheets of foam or sponge prior to mass cutting.

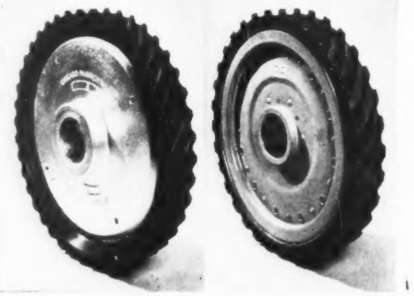
Originally developed specifically for shoe manufacturers to help them overcome the structural weakness of foam when used as an outer sole, this compound was found during testing operations to adhere equally well to sponge rubber, cork, fiberboard, glass fiber, canvas, fabric, and paper, it is also claimed.



Reversible Work Gloves with Vinylite Coating

Vinyl Coated Gloves

REVERSIBLE work gloves which fit either hand and have a protective vinyl coating are being made by Washington Glove Corp., Milwaukee 2, Wis. The gloves employ a long-wearing coating of Vinylite resins, made by Bakelite Co., and are said to outlast four or more pairs of conventional work gloves. A free-swinging thumb permits reversing the gloves to extend their life and allows more finger freedom than conventional gloves provide. A non-slip finish on the resin coating provides a strong grip, and the gloves have a soft, fleecy lining for warmth and comfort. Available in natural color, the gloves are made with coated wrists in either short or long gauntlet style, as well as with knitted wrists.



Rubber-Rim Abrasive Belt Contact Wheels Made by *(Left)* Chicago Rubber Co. and *(Right)* Divine Bros. Co.

Abrasive Belt Wheels

THE development of a new design in abrasive belt contact wheels has been announced by Behr-Manning Corp., Division of Norton Co., Troy, N. Y. Designated the Rubber-Rim wheel, it is constructed from two basic members: a steel rim on to which rubber in durometer hardness ranging from 10-90 has been molded, and a set of flanges which contain the rubber rim. The new wheels offer several advantages over conventional solid disk wheels, which are constructed of rubber molded on to a solid aluminum disk. The new wheels are lighter in weight, an important factor for required balance in high-speed roughing operations, and the rubber face is quickly replaceable when damaged or worn out.

The Rubber-Rim wheels are available in the company's Cog-Tooth design, as well as the standard 45-degree serrated and the

(*Continued on page* 558)

EUROPE

GREAT BRITAIN

RGA Meeting

The proposed new Excess Profits Levy, which is to be introduced in the United Kingdom and which will be added to the already heavy burden of taxation on the plantation rubber industry, was among the topics dealt with in a speech by A. P. Hamilton, retiring chairman of the Rubber Growers' Association, at the organization's annual meeting held March 31.

Mr. Hamilton stressed that the increased export duties introduced in Malaya at the instigation of the United Kingdom Government were as heavy as the Excess Profits Levy and have been imposed, as the latter will be, on "the fortuitous profits arising out of the needs of rearmament", so that the rubber industry would in effect be subjected to double taxation in this respect. Moreover, the basic years fixed on, 1947-49, a period during which rubber prices were low while producers had to undergo the high costs of rehabilitation after the Japanese occupation were quite inappropiate for the rubber industry.

Turning to costs of production, the speaker stated that in 1950, with an average selling price of 2s. 9d. per pound, costs had probably averaged under 1s., but today he doubted whether even the most efficient producer could claim costs much, if anything, below 2s. per pound. The increase in costs were caused by higher wages—some five times the prewar rates—reduced crops as a result of Communist activity, vastly inflated prices for all materials, and the heavy export duties. Cost of replanting was about £100 an acre, or about twice that of 1946 and three times the prewar cost.

On the subject of Malaya and Indonesia, Hamilton remarked that for the first time the former had fallen behind the latter in rubber production. But the case of European growers in Indonesia was not favorable: the progressive increases in company tax, the lack of a double taxation agreement, and rigorous exchange and monetary regulations had combined to make rubber production unprofitable for many so that several estates have closed down or have had to be leased.

At the meeting Sir Sydney Palmer, C.B.E., was elected chairman, and P. B. L. Coghlan, vice chairman for the ensuing year.

Sir Eric Macfadyen was presented with the Association's honorary gold medal for his services to the plantation rubber industry.

More on Technically Classified Rubber

A discussion of the value of the test methods employed in the technical classification of natural rubber appearing in *The India Rubber Journal*[1] in which opposing views were expressed by H. C. Harrison and R. G. Newton has been continued in a recent issue.[2]

Mr. Harrison repeats an earlier statement, that the varying cures indicated by laboratory tests do not exist after processing on a factory scale. He states his views as follows:

(1) The 600% modulus test is unreliable owing to errors in testing, etc.

(2) It seems impossible to believe that tests on newly made rubber at the plantations can be coordinated with the tests on the same rubber after, perhaps, many months of storage under varying atmospheric conditions.

(3) Seeing that the authors of the modulus test have found it necessary to raise the original figures by 66 to 87% and that the Mooney plasticity figures need reconsideration, it would appear that the original specifications were based on guess-work or inaccurate test results.

(4) The manufacturers and various laboratories have never made a practice of testing plantation rubber before use, but rather after mixing, which procedure he thinks, is the correct one. If they have not resorted to blending of the raw rubber, this would point to the fact that no important variation in cure has been found.

Finally Harrison refers readers to an article by Dunlap, Glaser and Nellen, in *Rubber Chemistry and Technology*[3] and also in *Analytical Chemistry*.[4]

In reply to the above Dr. Newton concedes points of agreement and corrects misunderstandings. He admits there are

this rubber got tight in a hurry!

	TUEX per 100 RHC	MBT per 100 RHC	Sulfur per 100 RHC	PSI Tensile	PSI Modulus 400%	% Elongation
Natural Rubber (black)	.23	—	3.0	4430	1650	730
Natural Rubber (non-black)	.40	1.5	1.0	2050	1200	520
GR-S (non-black)	.62	—	2.5	1270	570	700
Butyl Rubber	1.00	—	2.0	2200	550	830
PARACRIL	3.00	—	0.0	2750	2700	420

with Tuex® — the accelerator that gives a really *fast, tight* cure for all natural and synthetic rubbers. Used as a primary accelerator with or without sulfur, or as an activator for other accelerators, quick-acting Tuex makes possible high modulus and very good tensile strength.

Tuex (tetramethylthiuram disulfide) is available as a powder, or in free-flowing, dustless, fast-dispersing Naugets. Chart shows typical results of Tuex cures. For further information, write to address at left.

Naugatuck Chemical

Division of United States Rubber Company

137 ELM ST., NAUGATUCK, CONNECTICUT

IN CANADA: NAUGATUCK CHEMICALS DIVISION • Dominion Rubber Company, Limited, Elmira, Ontario

Rubber Chemicals • Aromatics • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices

grounds for view (1). A recent worldwide inter-laboratory comparison of modulus tests, organized by the British Rubber Producers' Research Association on behalf of the International Rubber Research Board, clearly demonstrated that high-elongation tests are less satisfactory than the recommended low-elongation "strain" test, and the tendency will be to use the latter in future. He adds that even when the "strain" test was used in Malaya, all three modulus classes were found, emphasizing that natural rubber does vary in rate of cure.

In refutation of view (2) he places the increasing number of reports from manufacturers showing that the vulcanization tests line up in a very satisfactory manner. View (3) is unjust, Newton finds, and indicates that Harrison does not appreciate the magnitude of the task involved in adjusting limits to correspond satisfactorily with the global output of natural rubber. The original work was done by the French in Indo-China, and it was then found that rubber from Malaya had somewhat different technical properties. The original figures he points out, were lowered and not raised, as Harrison suggests. Not enough is as yet known about the technical properties of rubber from the other Far Eastern centers, he continues, but it is quite conceivable that a further change in the limits may have to be made. The T. C. scheme should be regarded as flexible, and if, for instance, the present nine classes were found to be excessive, or if improved methods were advocated, the scheme could be modified accordingly, any changes being duly announced.

As to view (4), Dr. Newton states that he knows that the largest manufacturers *do* test their rubber before use and, before the advent of T. C. *did* have to blend it. Further evidence that natural rubber varies in rate of vulcanization (using low-elongation tests) is to be found in *Industrial and Engineering Chemistry*,[5] he adds, and concludes with the remark that the proof of the value of Technically Classified rubber is that several manufacturers have decided to buy it whenever they can get it.

[1] Feb. 23, and Mar. 1, 1952.
[2] Apr. 19, 1952, p. 17.
[3] Oct.-Dec., 1951, p. 820.
[4] Apr., 1951, p. 638.
[5] "Variability of Malayan Rubber." R. G. Newton, M. W. Philpott, H. Fairchild-Smith, W. G. Wren, Feb., 1951, p. 329.

British Trade Notes

Britain's exports of plastics materials have been increasing by leaps and by bounds in the last few years and in 1951 reached the record total of 53,147 tons, value £16,300,000, compared with 35,156 tons, value £9,100,000 in 1950 and 20,707 tons, value £5,200,000 in 1949. Exports of manufactures of plastics were valued at £3,270,000 of which toys (excluding dolls) accounted for £570,000.

C. Falconer Flint has been appointed director of research of the Factice Research & Development Association, Manchester, in succession to J. B. Harrison.

SEE PAGE 450

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PX-438	DiOctyl Sebacate
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The 1952 British Industries Fair, which closed May 16, drew a record number of United States visitors, but otherwise failed to attract as many visitors and buyers as in the preceding year. The London Sections at Earl's Court and Olympia reported 25% fewer overseas buyers and 30% fewer home buyers than in 1951. At Castle Bromwich, Birmingham, the difference was 30% fewer overseas buyers and 10% fewer home buyers. It is said that buyers at Castle Bromwich found that while the quality of the exhibits was good, delivery dates were too long in comparison with German offers.

The next British Industries Fair is scheduled for April 27 to May 8, 1953.

Prizes up to a value of £150, for award in July, 1953, are being offered by the Council of the British Plastics Federation, administrators of the Bowen (Plastics and Cables) Prize Fund. Awards will be made for papers on original investigations in engineering and/or phyisical problems relating to compression, transfer, or injection molding.

GERMANY

Rubber Industry in Western Germany

At the cost of strenuous efforts, output of rubber goods in Western Germany has increased yearly since the end of the war, but the goal of the local industry, the level for all of Germany in 1938, has not yet been completely achieved, Dr. Stephen Born points out.[1]

Total production in 1938 for all of Germany was about 250,000 tons, including roughly 130,000 tons of tires, or about 52% of the whole, and 120,000 tons of other rubber goods, or 48%. In 1951 the total output for Western Germany was 226,267 tons, of which 109,255 tons, or 48.2%, were tires, and 117,012 tons, or 51.8%, other rubber goods. The difference in the 1951 level of output, as compared with 1938, is greater in the case of tires than of other rubber goods, a circumstance that may well be due to a shift of emphasis in the production of the various types of goods.

Compared with 1950 figures, those for 1951 indicate an advance in practically every line except cycle tires, production of which dropped by 35.8% in 1951, as will be seen in the table below (figures in tons):

Production	1950	1951	Difference in %
Cycle tires	19,502	12,513	−35.8
Tires for motor cycles and automobiles	26,316	32,256	+22.6
Truck and special tires	44,151	54,476	+22.9
Tire repair material	7,829	10,010	+27.9
Total tires	97,798	109,255	+11.7
Heels and soles	22,279	24,875	+11.6
Rubber footwear	10,912	11,717	+7.4
Belting	6,139	6,924	+12.8
Lined hose	7,461	7,837	+5.0
Other mechanical rubber goods	30,581	35,325	+15.5
Surgical soft rubber goods	4,627	4,641	+0.3
Rubberized fabrics and products	4,118	4,368	+6.1
Other soft rubber goods	11,968	15,230	+27.2
Hard rubber goods	5,233	6,095	+16.5
Total Other Rubber Goods	103,318	117,012	+13.3
Grand Total	201,116	226,267	+12.5

The 1951 output required 59,223 workers, 273,005 tons of coal, 83,089 tons natural rubber, 4,426 tons synthetic rubber, and 27,500 tons of reclaim; while the corresponding 1950 figures were 55,805 workers, 267,471 tons of coal, 80,323 tons of natural rubber, 3,455 tons of synthetic rubber, and 21,519 tons of reclaim. Or as Dr. Born computed it, an increase in output of 12.5% in 1951 over that of 1950 required 2.8% more working time, 2.1% more coal, 9.1% more electric current, 4.5% more rubber, and 27.6% more reclaim.

We are reminded that the early months of 1951 were rendered difficult by the unusually tight foreign exchange situation which seriously hampered imports of natural rubber in the spring of that year, leading to a near crisis in the industry. Arrivals of rubber fell from 10,319 tons in January, 1951, to 4,606 tons in May, and consumption dropped from a record 8,978 tons in March to 6,561 tons in May; careful husbanding of existing rubber supplies and greatly increased use of reclaim helped to tide manufacturers over the uneasy period.

Dr. Born points to the ironic fact that demand for rubber

[1] *Kautschuk und Gummi*, 5, 4, 74 (1952).

goods, which had boomed after the outbreak of the Korean War and was stimulated by the shortage of rubber, fell sharply in the summer and fall months, just when rubber was becoming more readily available.

As for the outlook for the future, the author considers the various factors determining the trend of German economy and the repercussions on the rubber industry, more particularly on the tire branch; he points to the fact that rubber goods must struggle in keen competition with similar goods made from other materials; that there is an overabundant supply to meet a limited demand a situation which would not be materially altered by possible defense demand, since that for the most part would mean a switching from private to government orders and would not greatly affect the overall demand. He concludes that if the West German rubber industry succeeds in raising production in 1952 only a little above the 1951 level, it should be very well satisfied.

AUSTRIA

With the aid of Marshall Plan financing, Semperit Oesterreichisch-Amerikanische Gummiwerke A. G., has been enabled to regain its high wartime level of production. In 1945 the concern had lost about 80% of its equipment, but Marshall funds helped pay for imported machinery and for a thorough modernization of plants. In 1951, output totaled more than 20,000 tons, almost three times the prewar figure for the factories still left in Austria, and it is expected that if uninterrupted supplies of raw materials are available, the same high level of production will be maintained in 1952.

The company, which at the end of 1951 employed 5,554 factory workers and 1,102 office workers, states that exports figure to only a small extent in total sales. Before the war its chief customers were the South East European countries, but today no exports are possible to that area, except to Yugoslavia; business with western Europe and overseas meets with the keenest competition.

SWEDEN

Since 1940, Svenska Oljeslageri A.B., Sweden, has been operating research divisions for the production not only of vegetable oils, but also of synthetic resins and chemicals. Among the products developed are alkyd, phenolic, carbamide, and maleic resins, plasticizers, textile finishing agents, wetting agents, and pigments.

In recent years plastics have attracted a number of companies, and at present 250 factories, employing between 5,000 and 6,000 persons, engaged in the conversion of plastics in Sweden. These enterprises, however, about two-thirds of which are small, are reportedly finding it increasingly difficult to meet German and British competition, and it is feared some of the factories, chiefly the smaller ones, will have to close, for a time at least.

FAR EAST

MALAYA

Results of Declining Rubber Prices

The possibility that the price of natural rubber might soon touch the dollar mark (Straits currency) was vaguely foreseen by some in April, but not really believed; that it would drop to the pre-Korean level of around 78 cents within a few short weeks would have seemed fantastic.

With American buyers practically out of the market and only moderate purchases by other consuming countries, it seems now —looking back—that only the expectation that the Rubber Study Group at Ottawa would somehow provide the right formula for the situation, shored prices up a little longer once they began to sag below one dollar. When this hope failed, prices simply

let go. The market fluctuated nervously—now up a little at a favorable rumor, as the imminent devaluation of the English pound, then down again, lower than ever when the rumor proved baseless.

The Malayan Government, which has already lost millions of dollars in revenue from rubber exports, has been urged to do something about the situation and to investigate allegations that speculator's activities were behind the fall in price, but the government has announced that no steps will be taken until after the return of the Malayan delegates to Ottawa. Naturally the American Government is expected to take some action in this emergency, which, it is pointed out, is a made-to-order opportunity for Communism. On various sides it has been urged that destinational controls be lifted—the news that Ceylon was selling rubber to the Reds at over one dollar (S. S. currency) per pound while prices were tumbling, was not conducive to impartial thinking.

Smallholders have reacted promptly to the lower price levels and especially in Johore proceeded to cut tappers' wages from 80 to 70 cents per kati (1⅓ pounds). Fears were expressed that a continued drop in prices would force many smallholdings to stop operating, which, incidentally, would be in line with their reaction on former similar occasions.

The estates will also cut wages for the July-September period. At first it was stated that there would be no reduction in the wage scale unless it became certain that the price average for the second quarter of 1952 would be less than one dollar. By the third week in May, employers had evidently decided that the price fall was not a temporary set-back, and the Malayan Planting Industries Employers' Association and the negotiating committee of the Plantation Workers' Unions are to meet and discuss new wage rates. Decisions made will affect 300,000 rubber estate workers and are expected to have repercussions on a large section of all types of workers in the Federation.

Tappable Areas and Production

In recent months, since prices began to slide, the probability that under certain conditions smallholders might be easily susceptible to Communist propaganda has been repeatedly stressed. News regarding the position and activities of smallholders, therefore, comes in for special consideration, and the 1951 report of the Smallholders Advisory Service of the Rubber Research Institute of Malaya becomes of more than usual interest.

From this report it is learned that there was a marked decline in production of rubber by smallholders in 1951, a decline due to a combination of factors. First, the highly intensive tapping following boom prices adversely affected plantings, more particularly the oldest areas. Then there were the emergency measures taken to combat banditry. In certain districts large areas of rubber had to be closed for production because of the emergency; it is, however, noted that the total of these areas forms only a small proportion of smallholder rubber. But other emergency regulations have caused disorganization of established routine over a large proportion of the country's rubber lands. Thus resettlement has had the effect of removing smallholders and their tappers to some distance from their tasks, entailing loss of time; partial curfew prevents early tapping; and prohibition of carrying food to work in many districts also reduces working hours for tappers.

Available information indicates that nearly 1,000,000 acres of rubber land are divided into smallholdings of 25 acres and less; there are said to be about 350,000 holdings, so that on the average the size is less than three acres per holding.

The oldest rubber areas are evidently considered practically past care, since it is suggested that their productive capacity might possibly be restored by a prolonged rest, such as occurred in the period of Japanese occupation; replanting is recommended as the better way. It is added, however, that the necessity of replanting smallholdings on a large scale over a short period of years will not permit maximum benefits to be obtained from replanting.

Official statistics of the acreage of tappable rubber in the Federation for March, 1952, shows that 9,293 acres were abandoned, and 484 acres given up in the resettlement plans. The tappable area was 1,718,503 acres, of which 1,563,585 acres were actually being tapped. Johore had the highest tappable area—460,937 acres; next came Selangor with 289,957 acres, Perak with 252,344 acres, and Negri Sembilan with 240,593 acres.

In Pahang, tapping was stopped on 8,355 acres, and 10,129 acres were only partly tapped.

In the first four months of 1952, 185,772 tons of rubber were produced, of which 102,263 tons were estate rubber. Total exports in the period came to 212,227 tons.

Editor's Book Table

BOOK REVIEWS

"Extrusion of Plastics, Rubber, and Metals." Herbert R. Simonds, Archie J. Weith, and William Schack. Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y. Cloth, 6 by 9 inches, 463 pages. Price, $10.

Fulfilling the need for an up-to-date text on the increasingly important subject of extrusion, this book provides a technical, yet essentially practical coverge of all aspects of extrusion. The first part of the book, comprising about two-thirds of the material, covers the extrusion of plastics and consists of 15 chapters. The comprehensive nature of the presentation is illustrated by the chapter headings: the plastics extrusion industry; economics; custom extrusion; plastic materials for extrusion; the process of plastics extrusion; theoretical aspects; conditioning of compounds; design and use of dies; instrumentation; monofilaments; shapes and tubes; sheeting and films; plastic coatings on wire and other products; and applications.

The second portion of the book consists of three individual chapters on the extrusion of rubber, metals, and miscellaneous materials. These chapters attempt to show how the principles and practices for plastics are applied to the extrusion of other materials, but the treatment is quite sketchy and of general interest only. The appendix to the book includes a handy glossary of terms, lists of manufacturers of extruded products and extrusion equipment, and tables of useful data and conversion factors. A detailed subject index adds to the value of the book.

"Plastics Molding." John Delmonte. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Cloth, 6 by 9 inches, 500 pages. Price $9.

Here is an excellent treatise on the plastics molding industry and its equipment, intended for plant superintendents as well as plastics engineers. Written in a clear and readable style, the book approaches the subject from an engineering viewpoint. In all discussions of equipment, emphasis is placed on the basic principles underlying plastics molding and the establihment of criteria to eliminate the guess work and confusion involved in many molding operations. The analysis of molding and accessory equipment is logical in sequence, starting with the flow of materials and passing to the techniques for handling the materials after proper flow has been established.

The 16 chapters of the book cover plastics molding materials; hydraulic pumps for molding presses; mechanical pressure systems; hydraulic accumulators and packings; valves for the molding plant; distribution of gases and fluids; heat for the molding of plastics; material preparatory equipment; compression and transfer molding equipment; design of compression and transfer molds; injection molding machines; design features of injection molds; extrusion equipment; finishing accessories for the plastics molding plant; instrumentation for the molding plant; and plant layout. Both author and subject indices are appended.

NEW PUBLICATIONS

"At Last! A New Source for Rebuilding Banbury Mixers." Hale & Kullgren, Inc., First Federal Saving & Loan Bldg., Akron 8, O. 4 pages. This bulletin describes the company's services in rebuilding Banbury mixers and supplying new mixing chambers and parts. Illustrations show the various steps in rebuilding a mixer.

Publications of Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J. **"Calco Rubber Chem Lines."** 4 pages. This pamphlet is the first of a series to be published occasionally on items of general interest to the rubber industry. This issue presents information on the use of Pepton *22* plasticizer in hot, cold, oil extended, and black masterbatched GR-S.

"Pepton 22 Plasticizer in Oil Extended GR-S." Calco Technical Bulletin No. 816, Supplement No. 1. 5 pages. Data reveal that Pepton 22 gives good plasticizing action in both GR-S X-628 (now GR-S 1700) and the furnace black masterbatch X-629 (GR-S 1800).

"The Intermix." Francis Shaw & Co., Ltd., Corbett St., Manchester 11, England. 24 pages. Complete information is offered in this booklet on the sizes, specifications, design, construction, installation, operation, and maintenance of the company's internal mixers for rubber and plastics. Adamson United Co. is the manufacturing and sales licensee for these mixers in United States and Canada.

"Aminox." Compounding Research Report No. 18. Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn. 14 pages. The properties and uses of Aminox, an antioxidant for imparting resistance to oxidation and heat deterioration, are discussed in detail in this report. Extensive data are given on the use and effect of Aminox in various types of natural, neoprene, and nitrile rubber stocks.

"The Application of Precipitated Calcium Carbonates in Reinforced Plastics." Diamond Alkali Materials in Plastics, Bulletin #7. Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, O. 21 pages. This revised bulletin reviews the use of Surfex MM and Kalite in fabricating reinforced polyester plastics. Comprehensive laboratory test data illustrate the advantages of these materials and their effects on properties and cost factors.

"Heat Seal Coatings." Technical Data Sheet C-66. American Resinous Chemicals Corp., Peabody, Mass. 1 page. This report gives information on a number of the company's Arrco heat seal coatings for use on paper, glassine, aluminum foil, and cellulose acetate.

"Partial Substitution of Natural Rubber by Synthetic Rubber in a Tread Type Recipe." Philblack Bulletin No. 21. Phillips Chemical Co., Akron 8, O. 3 pages. Data are presented on the results obtained by partial replacement of natural rubber with GR-S-100 and X-630 in a Philblack O tread compound. Such replacement indicates improvement in scorch resistance and abrasion resistance

"Taylor-Stiles Cutters for the Rubber Industry." Taylor, Stiles & Co., Riegelsville, N. J. 4 pages. Design features of the company's cutters are described and illustrated in this bulletin. The different cutters are briefly discussed, and information appears on their use by rubber manufacturers.

"Pliolite S-6B in Cold Rubber Shoe Sole Compounds." Techni-Guide PR-600-6. Goodyear Tire & Rubber Co., Inc., Akron 16, O. 12 pages. This bulletin gives data on a series of five shoe sole compounds based on GR-S X-625 reinforced with Pliolite S-6B. Extensive test data show that the Pliolite gives effective reinforcement by increasing hardness and stiffness and improving flex life, abrasion resistance, and tear strength.

"Preliminary Suggestions—Dow Latex 744-B for Latex Paint." Dow Chemical Co., Midland, Mich. 8 pages. Suggestions for the manufacture of paints based on a vinyl-vinylidene chloride copolymer latex comprise this report. Types of alkyds to be used with this latex, starting point formulations, and properties of the latex are also covered.

"Styrene Modified Alkyd Type Resins." Technical Data Report TX-10. Monsanto Chemical Co., Texas City, Tex. 16 pages. Intended as a general guide for manufacturers, this report gives information on styrene modified alkyd-type resins for use in enamels. Formulations, procedures, properties, and test methods are described.

Publications of E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. **"Neoprene Compounds, ASTM D735 and SAE Standard R-10."** BL-244. 20 pages. This report gives recomended neoprene formulae to meet the Type S, Class SC requirements of ASTM D735-52T and SAE R-10.

"The Influence of Other Elastomers on the Low Temperature Properties of Neoprene Vulcanizates." BL-245. 7 pages. Data show how the properties of Type WRT vulcanizates are affected by compounding with various amounts of GR-S, and by using a combination of GR-S and a conventional low-temperature plasticizer.

"Plastolein Plasticizers." Emery Industries, Inc., Carew Tower, Cincinnati 2, O. 26 pages. Information on the specifications and properties of six Plastolein plasticizers for vinyls, cellulosics, and synthetic rubbers appear in this illustrated booklet. Discussions of ultra-violet stability, heat stability, compatibility, viscosity, specific gravity, preparation of test samples, test methods, and stabilizers are also included.

"Applied Statistics." Vol. I, No. 1, March, 1952. Edited by Leonard H. C. Tippett. Published by Oliver & Boyd, Ltd., Tweeddale Court, Edinburgh 1, Scotland. 80 pages. Annual subscription, $4 postpaid. Published for the Royal Statistical Society, this new journal is intended to meet the needs not only of statisticians, but of all workers in industry, commerce, and science who must handle and understand statistics in their work. To be issued three times a year, the journal will present articles illustrating modern statistical methods in everyday applications.

Publications of the British Rubber Producers' Research Association, 48 Tewin Rd., Welwyn Garden City, Herts, England. No. 153. **"The Electronic Structure of the Oxygen Molecule."** W. Moffitt. 22 pages. A modified method is presented for the determination of the energies of excitation of different electronic states of the oxygen molecule. No. 154. **"Atoms in Molecules and Crystals."** W. Moffitt. 24 pages. A new approach to the problems of the electronic structure of molecules is proposed in this paper.

"Bi-Monthly Supplement to All Lists." Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago 11, Ill. April, 1952. 100 pages. **"Aluminum. The Pacific Northwest's New Basic Resource."** An Address by Frank L. Magee, vice president and general production manager, Aluminum Co. of America. 22 pages.

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Belt Wheels

(*Continued from page* 546)

straight face styles, and are being made in both 14- and 16-inch diameters. Both Divine Bros Co., Inc., Utica, N. Y., and the Chicago Rubber Co., Inc., Chicago, Ill., are manufacturing Rubber-Rim wheels. The Divine version of the wheel is assembled at the factory with through-riveted steel flanges and is balanced and trued as a unit. The Chicago version of the wheel can be separated by loosening four Allen set screws which hold the tire between two aluminum flanges. This latter design permits the user to interchange various wheel widths by using different widths of rubber rims.

MARKET REVIEWS

RUBBER

Commodity Exchange

WEEK-END CLOSING PRICES

Futures	Mar. 29	Apr. 26	May 24	May 31	June 7	June 14
Sept.	34.70	34.75	27.50	26.70	28.00	29.55
Dec.	32.80	33.50	26.20	25.70	26.70	28.00
Mar.	31.90	32.60	25.61	25.00	26.10	27.10
May	31.30	32.00	25.25	24.75	25.70	26.80
July	....	....	24.50	24.10	25.05	26.05
Total weekly sales, tons	2,050	3,250	5,460	5,050	5,460	4,320

NATURAL rubber futures prices moved irregularly on the New York Commodity Exchange during the period from May 16 to June 15. Prices fell during the second half of May, continuing the decline begun early in the month, then recovered to move upward during the first half of June in the face of improved factor demand and a firmer tone in the foreign markets.

September futures started the period at at 28.80¢, fell to a low of 26.26¢ on May 27, and then advanced irregularly to close at a high of 29.55¢ on June 13. Futures sales on the Exchange during the second half of May amounted to 10,060 tons, making the total for the month of 23,190 tons. Activity during the first half of June slackened off despite rising prices, and only 9,780 tons were traded.

No. 1 Ribbed Smoked Sheet was sold by GSA at 38¢ a pound, and the complete price list for natural rubbers appears in our June issue, page 430.

In the field of synthetic rubber, Congress passed a 21-month extension of the National Rubber Policy Act on June 16. This Act continues government ownership of the synthetic rubber industry until March 31, 1954, but requires RFC to report by March 1, 1953, to the President and Congress on a program to dispose of the $750,000,000 synthetic rubber industry. The President is required to put this program into the form of legislative recommendations to Congress by April 15, 1953

On June 16 the RFC announced that it will seriously consider a further reduction in its GR-S selling price. The RFC will close down its two remaining alcohol butadiene rubber facilities by September 1. The current GR-S selling price reflects the production costs of both relatively high-cost alcohol butadiene and relatively low-cost petroleum butadiene. Eliminating the alcohol butadiene plants should result in a lower selling price for synthetic rubber if RFC is to continue its stated policy of selling at cost. The agency declared, however, that any such price reduction could only be made after considering the effect of the lower price on the economies of the natural rubber producing countries. The two alcohol butadiene plants are the Kobuta, Pa., plant operated by Koppers Co., Inc., scheduled for shut down July 1, and the Louisville, Ky., plant operated by Union Carbide & Chemical Co., to be closed September 1.

GR-S selling prices effective with June permits are shown in the following table listing rubber designations in accordance with the new RFC classification system which was set forth in our June issue on page 386.

Types	(All Prices Provisional)	Price per Lb. ¢
	Hot GR-S Non-Pigmented	
	Staining	
1000	(GR-S, GR-S-20, X-630, X-671)	23.00
1002	(GR-S-10, X-641, X-650, X-655)	23.25
1004	(GR-S-AC, GR-S-20AC, X-12)	23.00
1005	(GR-S-10AC)	23.25
1007	(GR-S-65)	23.00
1008	(GR-S-60)	23.25
1015	(X-489)	23.25
1016	(GR-S-65 SP)	23.25
1017	(GR-S-60 SP)	23.50
1021	(X-278 SP)	24.00
1023	(X-627 SP)	23.25
	Slightly Staining	
1001	(GR-S-50, X-631, X-694)	23.00
1003	(GR-S-18, X-274)	23.25
1014	(X-491)	23.50
	Non-Staining	
1006	(GR-S-21, GR-S-25, GR-S-26)	23.00
1009	(GR-S-62, X-640, X-675, X-704)	23.25
1010	(GR-S-30AC, X-644, X-685)	23.00
1011	(X-645)	23.25
1012	(GR-S-86, GR-S-86 SP, X-567)	23.00
1013	(GR-S-40AC)	23.00
1018	(GR-S-61 SP, X-702)	23.50
1019	(GR-S-66 SP, X-703)	23.25
1020	(X-549 SP)	23.50
1022	(X-496 SP, X-674 SP)	23.50
	Hot GR-S Black Masterbatches	
	Staining	
1100	(Black I, Black III, Black IV)	18.25
1101	(X-360)	17.50
1103	(X-579)	17.75
	Slightly Staining	
1102	(X-433)	16.25
1104	(X-419)	17.75
	Cold GR-S Non-Pigmented	
	Staining	
1500	(GR-S-100, GR-S-101, X-647, X-670)	23.00
1505	(X-600)	23.00
	Slightly Staining	
1501	(X-637)	23.00
	Non-Staining	
1502	(X-625)	23.00
1503	(X-565 SP, X-620 SP)	23.25
1504	(X-601 SP, X-697 SP)	23.25
	Cold GR-S Black Masterbatches	
	Staining	
1600	(X-580, X-581, X-582)	18.25
1601	(X-598, X-607, X-608, X-656)	18.25
	Cold GR-S Oil Masterbatches	
	Staining	
1700	(X-628, X-654, X-700)	19.25
1701	(X-660, X-663, X-696)	19.25
	Slightly Staining	
1702	(X-699)	19.25
	Cold GR-S Oil-Black Masterbatches	
	Staining	
1800	(X-629, X-686)	16.50
	Latices	
	Tank Car Quantities (10,000 Gals.)	
	Hot Latices	
2000	(Type III, Type IV)	21.50
2001	(X-381)	21.50
2002	(X-446)	23.50
2003	(Type V)	25.00
2004	(X-653)	25.00
2005	(Type VI)	25.00
	Cold Latices	
2100	(X-547)	24.50

Latex

Upon disposing of the last of the *Hevea* latex stocks in government hands, GSA declared a free market in latex on June 10. Final sale of GSA stocks had been expected at the beginning of June, but was delayed because consumers hesitated to purchase 62.5¢ latex when the advent of the free market would bring much lower prices. At the end of the market period of May 16 to June 15, the latex market picture was one of confusion as regards prices. Prices were still leveling off at the end of the period, and many discrepancies existed, but most dealers quoted *Hevea* latex at about 38¢ a pound solids in tank car quantities, and 42¢ a pound solids in drum lots.

Stocks of *Hevea* latex in the hands of the primary importers are the largest they have ever been, according to Arthur Nolan, Latex & Rubber, Inc., writing in the June issue of *Natural Rubber News*. Stocks are ample for June and July requirements even though arrivals during these two months may not be high. Consumers' inventories of latex, however, are at a minimum level, and the rebuilding of these inventories will make appreciable inroads on stocks.

While the immediate supply picture for *Hevea* latex is satisfactory, some trade observers expect a tight position to develop in the third quarter as the result of expected sharp increases in consumption. Under the free market, latex prices are at a level where most users believe latex demand for the foam rubber market will rise substantially. Nolan notes, however, that producers are not working their plants at a rate which will support current United States consumption, let alone the increased demand already evident in Europe. Current latex differentials are held by producers to be too low to warrant increasing production at the expense of dry rubber production.

Imports of *Hevea* latex during March totaled 3,570 long tons, dry weight; consumption, 4,159 long tons; and end-of-month stocks, 4,750 long tons. Estimates for April are for imports of 4,800 long tons, dry weight, consumption, 4,300 long tons, and end-of-month stocks, 7,000 tons.

Prices of GR-S latices range from 21.5-25.0¢ a pound solids, as shown in the table appended to the rubber market review. Production of GR-S latices amounted to 2,933 long tons, dry weight, in January; 2,716 long tons in February; 2,975 long tons in March; and an estimated 3,194 long tons in April. Imports totaled 167 long tons, dry weight, in January; 225 long tons in February; 162 long tons in March; and an estimated 191 long tons in April. Consumption was 3,034 long tons in January; 3,167 long tons in February; 3,469 long tons in March; and an estimated 3,570 long tons in April. Stocks on hand at the end of March totaled 3,059 long tons, dry weight.

Neoprene latex production amounted to 445 long tons, dry weight, in January; 624 long tons in February; 615 long tons in March; and an estimated 624 long tons in April. Consumption of neoprene latex totaled 515 long tons in January; 593 long tons in February; 563 long tons in March; and an estimated 586 long tons in April. Stocks on hand at the end of March amounted to 1,174 long tons, dry weight.

Nitrile rubber latex production totaled 289 long tons, dry weight, in January; 219 long tons in February; 170 long tons in March; and an estimated 267 long tons in April. Consumption figures show 217 long tons in January; 177 long tons in February; 172 long tons in March; and an estimated 267 long tons in April. Nitrile rubber latex stocks at the end of March totaled 518 long tons, dry weight.

RECLAIMED RUBBER

THE big news in the reclaimed rubber market picture during the period between May 16 and June 15 was the appearance of Rubber Reclaimers Association representatives before the Senate Small Business Subcommittee early in June. The Association charged that the government was squeezing the reclaim industry by selling GR-S at 23¢ a pound and asked the Subcommittee to ascertain whether or not the RFC was selling its synthetic rubber at below cost.

The reclaimers stated that they were only seeking to have the synthetic rubber price reflect the true costs of its production. With labor and freight costs rising, reclaimers said that they did not want to force down the price of scrap rubber in order to maintain reclaim prices, since such a step might force scrap dealers out of business. According to reclaimers, if the synthetic rubber industry was run privately, the price would have to be 28-31¢ a pound to reflect a profit after taxes. Reclaimers objected to what they described as use of their tax dollars to subsidize their chief competitor. Sales by reclaimers were said to be down 30-40%, mainly owing to competition from synthetic rubber.

Most reclaiming plants will be shut down in July for employe vacations and mill inventory taking. Sales of reclaim to recappers were said to be at a standstill, and some of the larger recappers were reported to have laid off workers. The outlook for any improvement in recapping business is pessimistic in view of the government order permitting the manufacture of third-line tires.

Final March and preliminary April statistics on the domestic reclaimed rubber industry are now available. Final March figures show a production of 22,808 long tons; imports, 25 long tons; consumption, 24,797 long tons; exports, 1,054 long tons; and end-of-month stocks, 40,579 long tons. Preliminary April figures are as follows: production, 24,126 long tons; consumption, 23,906 long tons; exports, 948 long tons; and end-of-month stocks, 40,903 long tons.

SCRAP RUBBER

TRADING in scrap rubber during the period from May 16 to June 15 continued on the slow side. Most price quotations for scrap were considered nominal by dealers and not the basis for any actual transactions. The immediate outlook for any improvement in the market was not bright in view of the approaching vacation shutdowns and inventory takings at the reclaiming mills. Toward the end of the market period the attention of the scrap rubber industry was focused on the activities of the Rubber Reclaimers Association before Congressional groups, as discussed in the reclaimed rubber market. Most dealers agree that any further reductions in the price of synthetic rubber would work to the detriment of the scrap rubber trade; in fact, another 3¢ a pound drop in the synthetic price would probably make scrap tube stock worthless.

OPS ceiling prices for scrap rubber were given in our September issue, page 756. Following are dealers' actual selling prices for scrap rubber in carload lots, delivered to mills at the points indicated:

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires	$9.00/10.00	$15.50
S. A. G. auto tires	Nom.	Nom.
Truck tires	Nom.	17.50–18.00
Peelings, No. 1	Nom.	47.50/50.00
2	Nom.	26.00/27.00
3	Nom.	22.00/23.00
	(¢ per Lb.)	
Auto tubes, mixed	2.25/ 2.50	2.50/ 2.75
Black	3.00	3.00
Red	6.50/ 7.00	7.00/ 7.50
Butyl	2.50/ 2.75	2.50/ 2.75

COTTON AND FABRICS

New York Cotton Exchange Week-End Closing Prices

Futures	Apr. 26	May 17	May 24	May 31	June 7	June 14
Oct.	36.96	36.40	36.26	36.90	37.33	37.35
Dec.	36.65	36.17	36.04	36.58	37.02	37.07
Mar.	36.50	35.97	35.90	36.36	36.89	36.96
May	36.34	35.83	35.77	36.21	36.73	36.77
July	35.93	35.50	35.39	35.90	36.32	36.25
Oct.	....	34.16	33.99	34.47	34.76	34.68

IRREGULAR advances in spot and future cotton prices were noted on the New York Cotton Exchange during the period from May 6 to June 15. Market undertones were steady, and the price rise stemmed from increased mill fixations, a growing tightness in the better grades of raw cotton, the unfavorable Korean and German situations, and reports that the new crop may fall below estimates.

On May 19 the OPS suspended price controls on raw cotton under Amendment 1 to CPR 8. Under this amendment cotton ceilings will be suspended until selling prices rise to 43.05¢ a pound for spot cotton and 43.39¢ a pound for futures. The reimposition point for spot cotton is 2¢, the maximum daily fluctuation allowed on the exchanges, plus an 0.71¢ average freight differential below the CPR 8 ceiling price. The reimposition point for futures is 2¢, or one trading day, below the ceiling. Should controls be reimposed, they will remain in force until suspended by a subsequent order. This action will prevent a continual see-saw between suspension and control.

OPS officials said they saw no prospect of cotton rising to the triggering point in the current crop year, but admitted that official estimates of the 1952-53 crop might boost prices to the reimposition point. Cotton spokesmen were surprised and pleased with the unexpectedly high reimposition levels and predicted that these figures would actually serve as unofficial ceilings with most traders willing to sell below them to avoid formal ceiling restrictions and reporting requirements.

The 15/16-inch middling spot cotton price started the period at a low of 39.45¢, fell back to this figure on May 23, then advanced slowly to reach a high of 41.60¢ on June 9 before closing the period at 41.55¢. Futures prices showed corresponding movements, with October futures starting at 36.40¢ on May 16, falling to a low of 36.26¢ on May 23, rising to a high of 37.38¢ on June 9, and closing the period at 37.35¢.

Fabrics

Ceiling prices on practically all textiles, including cotton, silk, wool, and synthetics, were suspended by OPS on May 19. Exceptions to the suspension order included all synthetic tire fabrics and synthetic staple fibers. Suspension of controls on cotton textiles was taken under Amendment 1 to Revision 1 of GOR 4, and Amendment 5 to CPR 37. When the average price of cotton textiles, as shown by an index figure, reaches 90% of 1951 peak prices, controls will be reimposed. At the date of suspension, the index indicated cotton textile prices as being about 17.5% below this triggering point.

An improved market for wide industrial fabrics was noted during the period from May 16 to June 15, even though actual trading took place only on a moderate basis for relatively nearby delivery. A few mills were reported to have gone back to a five-day production week as the first step toward meeting a growing tightness in fabric constructions. Inventories in the hands of users such as the coating, automotive, and furniture trades are now down to unusually low levels, and, barring a sustained steel strike, a marked pick-up in demand for fabrics is expected.

Cotton Fabrics

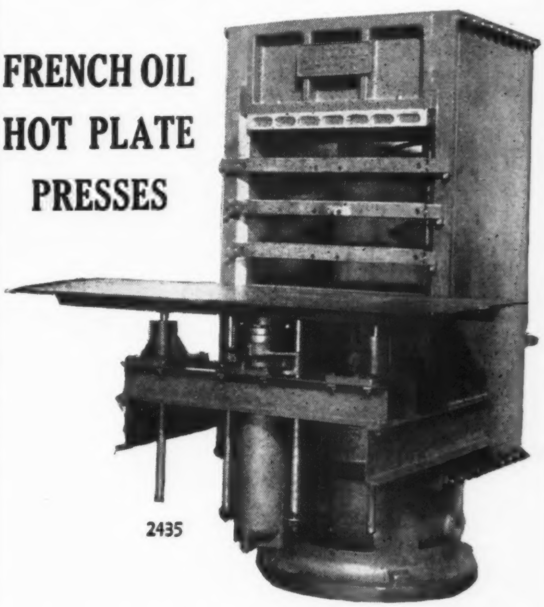
Drills		
59-inch 1.85-yd . . . yd.	$0.36	/ $0.365
2.25-yd	.31	/ .32
Ducks		
38-inch 1.78-yd S. F. . . . yd.	.36	
2.00-yd. D. F.	.30	/ .31
51.5-inch, 1.35-yd, S. F.	.5325	
Hose and belting	.76	
Osnaburgs		
40-inch 2.11-yd . . . yd.	.2475	
3.65-yd	.155	/ .1575
Raincoat Fabrics		
Print cloth, 38½-inch, 64-60 . yd.	.145	/ .1475
Sheeting, 48-inch, 4.17-yd	.225	
52-inch 3.85-yd	.245	
Chafer Fabrics		
14-oz./sq. yd. Pl. . . . lb.	.83	
11.65-oz./sq. yd. S.	.74	
10.80-oz./sq. yd. S.	.76	/ .78
8.9-oz./sq. yd. S.	.795	
Other Fabrics		
Headlining, 68-inch 1.35-yd., 2-ply . . . yd.	nom.	
64-inch, 1.25-yd. 2-ply	nom.	
Sateens, 53-inch 1.32-yd	.61	/ .62
58-inch 1.21-yd	.66	
Tire Cords		
K. P. std., 12-3-3 . . . lb.	nom.	
12-4-2	.90	

RAYON

TOTAL rayon production by domestic mills amounted to 81,900,000 pounds during May, an increase to 3,200,000 pounds over that of the preceding month. May yarn production totaled 58,900,000 pounds, or 3,000,000 pounds over the April figure. Production of viscose high-tenacity yarn during May was 36,100,000 pounds, representing an increase of 3,200,000 pounds over the April figure.

Rayon shipments by domestic producers during May totaled 92,400,000 pounds. Of this figure, 36,300,000 pounds were of viscose high-tenacity yarn. End-of-May rayon stocks held by producers amounted to 107,500,000 pounds, of which only 2,900,000 pounds were of high-tenacity yarn.

There were no changes in rayon tire fabric and yarn prices during the period from May 16 to June 15, and current prices follow:


2435

Rayon Prices

Tire Fabrics

1100/490/2			$0.72
1650/980/2	$0.695	/	.73
2200/980/2			.685

Tire Yarns

1100/ 480	.63
1100/ 490	.62
1150/ 490	.62
1650/ 720	.62
1650/ 980	.61
1900/ 980	.61
2200/ 960	.61
2200/ 980	.60
4400/2934	.63

Carbon Black Statistics

A RECENT report by the Bureau of Mines, United States Department of the Interior, indicates that carbon black output last year reached 1,677,363 thousand pounds, 21% more than in 1950. Total sales also were up, 4% to 1,563,138 thousand pounds; while producers' stocks increased 113,691 thousand pounds to 203,234 thousand pounds.

Largest gains were recorded for furnace blacks. Their production and sales rose last year 35% and 16%, respectively, over 1950 figures. Furnace blacks, moreover, accounted for 62% of 1951 sales, against 56% the year before.

In 1951, sales of contact blacks dropped 12%.

Stock of the latter rose from a 36-day supply on January 1, 1951, to an 88-day supply on December 31. The respective figures for furnace blacks were 10 and 30 days.

The value at plants of total production was $107,436,000. The average value was 6.41¢ a pound, against 6.12¢ in 1950.

"Rest of Texas" made the greatest gain in production; while Arkansas entered the list of producers, when part of a furnace plant was moved there from Kansas. Another furnace plant was moved from Oklahoma to Texas. On December 31, 58 plants were producing, including three furnace plants which started operations during 1951. Daily capacity at the year-end was 5,163,300 pounds, contrasted with 4,075,200 at the end of 1950.

The quantity of natural gas used in the production of carbon black rose somewhat to 426,423 million cubic feet, with an average value of 5.21¢ per thousand cubic feet. The amount of liquid hydrocarbons utilized was up 69% to 182,343,000 gallons to account for 52% of the furnace blacks produced.

Exports, controlled by the U. S. Department of Commerce during the entire year, hit 433,393 thousand pounds, a gain of 8% over the previous year's figure.

SALIENT STATISTICS OF CARBON BLACK PRODUCED FROM NATURAL GAS AND LIQUID HYDROCARBONS IN THE UNITED STATES, 1950-51

	1950	1951
No. of producers reporting ...	20	20
Plants	53	58
Quantity produced		
By states and districts		
Louisiana ..... *thousand lbs.*	226,177	258,989
Texas		
Panhandle ... *thousand lbs.*	638,159	700,659
Rest of state *thousand lbs.*	310,705	449,287
Total Texas *thousand lbs.*	948,864	1,149,946
Other states (Ark., Calif., Kan., N. Mex., Okla.) *thousand lbs.*	206,949	268,428
Total U. S. *thousand lbs.*	1,381,990	1,677,363
By processes		
Contact ...... *thousand lbs.*	616,765	645,881
Furnace ...... *thousand lbs.*	765,226	1,031,482
Quantity sold		
Domestic		
To rubber companies *thousand lbs.*	1,030,368	1,061,229
Ink companies *thousand lbs.*	50,903	45,496
Paint companies *thousand lbs.*	11,139	11,366
For miscellaneous purposes *thousand lbs.*	16,661	11,554
Total ..... *thousand lbs.*	1,109,071	1,129,645
Exports .... *thousand lbs.*	399,568	433,493
Total sales .. *thousand lbs.*	1,508,639	1,563,138
Losses .... *thousand lbs.*	269	534
Stocks held by producers, Dec. 31		
Contact types ... *thousand lbs.*	65,342	123,299
Furnace types ... *thousand lbs.*	24,201	79,935
Total .... *thousand lbs.*	89,543	203,234
Value at plants of carbon black produced		
Total .... *thousand $*	84,604	107,436
Average per lb .... *¢*	6.12	6.41
Quantity of natural gas used *million cu. ft.*	410,852	426,423
Average yield per M cu. ft. *lbs.*	2.57	2.67
Value of gas per M cu. ft. *¢*	4.79	5.21
Volume of liquid hydrocarbons used . *thousand gals.*	107,707	182,343
Average yield per gal ..... *lbs.*	3.02	2.96

Following are statistics for production, shipments, producers, stocks, and exports of carbon black for the first quarter, 1952. Furnace blacks are classified as follows: SRF, semi-reinforcing furnace black; HMF, high modulus furnace black; FEF, fast extruding furnace black; and HAF, high abrasion furnace black. Statistics on thermal black are included with SRF black to avoid disclosure of individual company operations.

(Thousand of Pounds)

	Mar.	Feb.	Jan.
Production:			
Furnace types:			
SRF	33,181	31,570	32,083
HMF	11,446	12,139	12,932
FEF	18,598	18,421	19,941
HAF	30,865	28,556	31,272
Total furnace	94,090	90,686	96,228
Contact types	53,372	50,802	53,305
TOTALS	147,462	141,488	149,533
Shipments:			
Furnace types:			
SRF	27,756	28,396	29,693
HMF	9,774	10,290	8,679
FEF	16,031	16,447	16,044
HAF	30,434	30,819	30,123
Total furnace	83,995	85,952	84,539
Contact types	40,316	39,151	44,714
TOTALS	124,311	125,103	129,253
Producers' Stocks, End of Period:			
Furnace types:			
SRF	30,917	25,492	22,318
HMF	23,488	21,816	19,967
FEF	27,484	24,917	22,943
HAF	26,211	25,780	28,043
Total furnace	108,100	98,005	93,271
Contact types	155,401	142,345	130,694
TOTALS	263,501	240,350	223,965
Exports:			
Furnace types	*	9,993	10,706
Contact types	*	12,316	19,585
TOTALS	*	22,309	30,291

SOURCE: Bureau of Mines, United States Department of the Interior, Washington 25, D. C.
*Not available.

Offers New Hose

U. S. Rubber has developed a new rubber hose for the construction industry which can be used to transfer concrete from batch mixer to trucks at a considerable saving in time and cost. The hose is also said to last at least six months; while the canvas spouts formerly used for this purpose usually lasted about one week. The hose is further claimed to remain flexible throughout its life; while the canvas absorbs concrete and becomes stiff. The rubber hose is also easier to clean and is free of clogging. This hose is made in sizes ranging from 18-24 inches in diameter and 18-36 inches in length. It is made of natural rubber reinforced with two piles of special fabric.

Estimated Automotive Pneumatic Casings and Tube Shipments, Production, Inventory — April, March, 1952; April, 1951

Passenger Casings	Apr. 1952	% of Change from Preceding Month	Mar., 1952	First Four Months, 1952	First Four Months, 1951
Shipments					
Original equipment	2,314,404		1,997,968	7,772,230	10,551,948
Replacement	3,466,062		2,951,952	12,877,264	10,544,666
Export	45,882		47,572	203,475	186,322
TOTAL	5,826,348	+16.59	4,997,492	20,852,969	21,282,936
Production	5,826,702	− 8.16	6,344,093	24,426,836	20,497,298
Inventory end of month	10,584,603	+ 0.25	10,558,217	10,584,603	2,254,915
Truck and Bus Casings					
Shipments					
Original equipment	499,187		486,337	1,950,561	1,862,515
Replacement	572,224		560,329	2,647,628	3,172,809
Export	68,891		89,449	360,696	249,187
TOTAL	1,140,302	+ 0.37	1,136,115	4,958,885	5,284,511
Production	1,362,575	− 5.52	1,442,120	5,883,345	5,337,021
Inventory end of month	2,710,788	+ 9.09	2,484,877	2,710,788	791,736
Total Automotive Casings					
Shipments					
Original equipment	2,813,591		2,484,305	9,722,791	12,414,463
Replacement	4,038,286		3,512,281	15,524,892	13,717,475
Export	114,773		137,021	564,171	435,509
TOTAL	6,966,650	+13.58	6,133,607	25,811,854	26,567,447
Production	7,189,277	− 7.67	7,786,213	30,310,181	25,834,319
Inventory end of month	13,295,391	+ 1.93	13,043,094	13,295,391	3,046,651
Passenger (Including Motorcycle and Truck and Bus Tubes					
Shipments					
Original equipment	2,812,644		2,484,419	9,725,001	12,425,287
Replacement	2,409,540		2,457,626	10,658,239	11,945,422
Export	83,234		92,198	397,148	268,939
TOTAL	5,305,418	+ 5.39	5,034,243	20,780,388	24,639,648
Production	5,481,364	− 0.28	5,496,841	21,698,403	22,284,486
Inventory end of month	11,012,722	+ 1.04	10,899,550	11,012,722	4,669,607

NOTE: Cumulative data on this report include adjustments made in prior months.
SOURCE: The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York 22, N. Y.

U. S. Imports, Exports, and Reexports of Crude and Manufactured Rubber

Imports for Consumption of Crude and Manufactured Rubber

	February, 1952 Quantity	February, 1952 Value
UNMANUFACTURED, Lbs.		
Crude rubber	165,270,173	$70,775,631
Latex	5,726,494	3,016,023
Guayule	101,700	29,061
Crude chicle	451,297	248,087
Balata	70,293	23,118
Jelutong or Pontianak	237,071	211,229
Gutta percha, etc	21,449	33,474
Reclaimed rubber	157,427	17,439
Scrap rubber	2,120,410	79,744
Synthetic rubber	2,379,717	632,932
TOTALS	176,536,031	$75,066,738
MANUFACTURED		
Rubber tires		
Auto, etc. ... *no.*	7,932	$233,936
Bicycle ... *no.*	3,320	15,310
Other ... *no.*	168	10,672
Inner tubes: auto, etc. *no.*	3,223	1,294
Footwear		
Boots ... *prs.*	132	288
Shoes and overshoes ... *prs.*	64,407	50,013
Rubber-soled canvas shoes ... *prs.*	2,069	1,263
Athletic balls		
Golf ... *no.*	18,720	6,068
Tennis ... *no.*	39,948	9,479
Other ... *no.*	66,427	17,370
Toys	......	28,936
Hard rubber goods		
Combs ... *no.*	3,888	541
Sundries	......	363
Other	......	54,306
Rubberized printing blankets ... *lbs.*	1,909	4,364
Rubber and cotton packing ... *lbs.*	4,700	12,997
Gasket and valve packing	......	309
Belting ... *lbs.*	24,101	27,204
Hose and tubing	......	9,725
Drug sundry sets ... *prs.*	22,680	6,307
Nipples and pacifiers *gr.*	9,100	11,420
Instruments ... *doz.*	901	2,621
Other rubber products	......	225
Rubber golf ball centers	......	22
Gutta percha manufactures ... *lbs.*	5,515	6,391
Rubber bands ... *lbs.*	4,233	2,180
Synthetic rubber products	......	381
Other soft rubber manufactures	......	127,705
TOTALS	......	$641,690
GRAND TOTALS, ALL RUBBER IMPORTS	......	$75,708,428

Exports of Domestic Merchandise

	Quantity	Value
UNMANUFACTURED, Lbs.		
Chicle and chewing gum bases	294,986	$139,894
Synthetic rubbers		
GR-S type	2,135,697	564,597
Neoprene	2,284,264	934,276
Nitrile type	346,328	186,189
Other, except butyl and polyisobutylene	30,205	46,358
Reclaimed rubber	1,883,791	184,593
Scrap rubber	2,200,837	111,596
TOTALS	9,176,108	$2,167,603

	February, 1952 Quantity	February, 1952 Value
MANUFACTURED		
Rubber cement ... *gals.*	75,599	$143,867
And rubberized fabric ... *sq. yds.*	130,285	108,176
Footwear		
Boots and shoes *prs.*	21,465	47,681
Rubber-soled canvas shoes ... *prs.*	16,775	34,124
Heels ... *doz. prs.*	60,363	72,282
Soling and toplift sheets ... *lbs.*	467,714	141,393
Gloves and mittens *doz. prs.*	12,737	64,763
Drug sundries	......	206,962
And rubberized clothing	......	173,197
Toys, balls, novelties, etc.	......	43,763
Hard rubber goods		
Battery boxes ... *no.*	24,157	49,182
Other electrical goods ... *lbs.*	167,852	135,428
Other	......	25,758
Rubber tires and casings		
Truck and bus ... *no.*	104,851	6,018,561
Auto and motorcycle ... *no.*	59,430	883,772
Aircraft ... *no.*	3,064	141,913
Off-the-road ... *no.*	15,742	2,048,801
Farm tractor ... *no.*	9,054	387,020
Farm implement. *no.*	3,705	64,840
Other ... *no.*	6,559	43,447
Inner tubes		
Auto ... *no.*	46,845	108,319
Truck and bus ... *no.*	78,024	388,163
Aircraft ... *no.*	2,080	11,300
Other ... *no.*	28,108	69,991
Solid tires		
Truck and industrial ... *no.*	3,100	63,775
Tire repair materials		
Camelback ... *lbs.*	379,023	128,605
Other ... *lbs.*	527,691	531,072
Tape, except medical and friction ... *lbs.*	55,007	42,353
Belting		
Fan belts, V-type *lbs.*	89,609	145,558
Transmission		
V-belts ... *lbs.*	105,829	217,388
Flat belts ... *lbs.*	85,556	126,880
Conveyor and elevator ... *lbs.*	181,779	206,550
Other ... *lbs.*	10,686	9,337
Hose		
Molded braided ... *lbs.*	492,822	491,801
Wrapped and hand built ... *lbs.*	116,543	126,512
Other hose and tubing ... *lbs.*	111,358	118,192
Packing		
Sheet type ... *lbs.*	74,834	52,323
Other ... *lbs.*	199,222	226,109
Tiling and flooring. *lbs.*	103,734	28,257
Mats and matting ... *lbs.*	215,611	65,943
Thread, bare ... *lbs.*	7,572	16,098
Textile covered ... *lbs.*	8,942	34,756
Compounded rubber for further manufacture *lbs.*	644,880	263,805
Other rubber manufactures	......	653,710
TOTALS	......	$14,971,727
GRAND TOTALS, ALL RUBBER EXPORTS	......	$17,139,330

SOURCE: Bureau of the Census, United States Department of Commerce, Washington, D. C.

Reexports of Foreign Merchandise

	February, 1952 Quantity	February, 1952 Value
UNMANUFACTURED, Lbs.		
Crude rubber	213,516	$120,410
Balata, gutta percha, etc.	1,760	1,123
TOTALS	215,276	$121,533
MANUFACTURED		
Rubber gloves and mittens ... *doz. prs.*	50	$160
Drug sundries	......	168
Toys, balls, novelties	......	995
Packing, except sheet type ... *lbs.*	740	2,388
TOTALS	......	$3,711
GRAND TOTALS, ALL RUBBER REEXPORTS	......	$125,244

United States Rubber Statistics—March, 1952

	New Supply: Production	New Supply: Imports	New Supply: Total	Distribution: Consumption	Distribution: Exports	Month-End Stocks
Natural rubber, total	0	81,577	81,577	31,330	93	61,236
Latex, total	0	3,570	3,570	4,159	0	4,750
Rubber and latex, total	0	85,147	85,147	35,489	93	65,986
Synthetic rubbers, total	*71,408 †6,758	1,489	79,655	68,744	3,488	150,094
GR-S types‡	*63,432 †31	1,316	64,779	57,163	2,787	118,340
Butyl	*7,976	173	8,149	6,120	0	19,271
Neoprene‡	†5,406	0	5,406	4,398	516	8,491
Nitrile types‡	†1,321	0	1,321	1,063	185	3,992
Natural rubber and latex, and synthetic rubbers, total	78,166	86,636	164,802	104,223	3,581	216,080
Reclaimed rubber, total	22,808	25	22,833	24,797	1,054	40,579
GRAND TOTALS	100,974	86,661	187,635	129,020	4,635	256,659

*Government plant production.
†Private plant production.
‡Includes latices.
SOURCE: Rubber Division, NPA, United States Department of Commerce, Washington, D. C.

Compounding Ingredients—Price Changes and Additions

Accelerators, Organic

Accelerator 49	*lb.*	$0.495	/ $0.505
DOTG	*lb.*	.52	/ .55
DPG	*lb.*	.43	/ .49
MBT-XXX	*lb.*	.455	/ .475

Accelerator-Activators, Inorganic

Litharge, Eagle and National Lead	*lb.*	.1875	/ .1885
Red lead, Eagle and National Lead	*lb.*	.1975	
White lead, basic, Eagle and National Lead	*lb.*	.177	/ .187
White lead, silicate, Eagle	*lb.*	.195	/ .2125
National Lead	*lb.*	.158	/ .168

Antioxidants

Antioxidant 2246	*lb.*	1.65	/ 1.68

Carbon Blacks

Statex 125 (SAF)	*lb.*	.11	/ .155

Colors

White

Zinc oxide, comml.	*lb.*	$0.1525	/ $0.185
Azo ZZZ-11, -44, -55	*lb.*	.1525	/ .1625
-66	*lb.*	.175	/ .185
35% leaded	*lb.*	.1575	/ .1675
5% leaded	*lb.*	.16	/ .17
Eagle AAA, lead free	*lb.*	.1525	/ .1625
5% leaded	*lb.*	.1525	/ .1625
35% leaded	*lb.*	.1575	/ .1675
50% leaded	*lb.*	.16	/ .17
Florence Green Seal	*lb.*	.17	/ .18
Red Seal	*lb.*	.165	/ .175
White Seal	*lb.*	.175	/ .185
Horsehead XX-4, -78	*lb.*	.1525	/ .1625
Kadox-15, 17, -22	*lb.*	.1525	/ .1625
-25	*lb.*	.175	/ .185
Lehigh, 35% leaded	*lb.*	.1575	/ .1675
50% leaded	*lb.*	.16	/ .17
Protox-166, -167	*lb.*	.1525	/ .1625
St. Joe, lead free	*lb.*	.1525	/ .1625
Standard, 5% leaded	*lb.*	1525	/ .1625

Dusting Agents

Extrud-O-Lube, Conc.	*lb.*	1.54	

Latex Compounding Ingredients

Habuco Resin Emulsion #226	*lb.*	.227	/ .232
2246-A	*lb.*	.275	/ .28
3408-B	*lb.*	.18	/ .19

Extenders

Oar-Bel-Ex A	*lb.*	.14	

Plasticizers and Softeners

Pepton 22	*lb.*	.745	/ .775

Reinforcers, Other than Carbon Black

Calcene NC	*ton*	72.50	/ 92.50
Hi-Sil	*lb.*	.10	/ .115

Retarders

Retarder PD	*lb.*	.35	/ .37

Synthetic Rubbers and Latices

Butaprene Latex (drywt.)			
NL types	*lb.*	.47	/ .52
NXM types	*lb.*	.55	/ .60
Butaprene NAA	*lb.*	.54	/ .55
NF	*lb.*	.49	/ .50
NL	*lb.*	.50	/ .51
NXM	*lb.*	.58	/ .59

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Light face type $1.25 per line (ten words)	Light face type 40c per line (ten words)	Light face type $1.00 per line (ten words)
Bold face type $1.60 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.40 per line (eight words)
Allow nine words for keyed address.		*Letter replies forwarded without charge, but no packages or samples.*

Address All Replies to New York Office at 386 Fourth Avenue, New York 16, N. Y.

SITUATIONS OPEN

WANTED by well-established manufacturer of high-grade mechanical rubber goods — FACTORY MANAGER, preferably a graduate Chemical or Mechanical Engineer, between 35 and 40 years old, with a minimum of 10 years' plant experience.

Thoroughly familiar with up-to-date procedures. Open-minded in his dealings with Labor, but insistent upon obtaining a fair day's return for a fair day's pay.

A man in vigorous health, enthusiastic, capable, determined to forge ahead. Opportunities to do so are provided for the man who qualifies.

Submit your application in confidence. Address Box #1072, c/o INDIA RUBBER WORLD.

SALES REPRESENTATIVE WANTED—PHENOLIC RESINS. Willing to make commission arrangement if so desired. Our men have been advised about this advertisement. Address Box No. 1073, care of INDIA RUBBER WORLD.

WANTED: CHEMICAL ENGINEER HAVING BROAD EXPERIence in mechanical molded goods line. Capable of mold design. Good opportunity for advancement. Address Box No. 1074, care of INDIA RUBBER WORLD.

WANTED:

RUBBER CHEMIST

Specialized in sponge rubber making. State salary, age, and send full particulars in first letter. Our staff knows about this advertisement.

ADDRESS BOX NO. 1081, c/o INDIA RUBBER WORLD

SITUATIONS OPEN (Continued)

WANTED: EXPERIENCED QUALIFIED MAN TO SET UP AND manage combining plant. Must have complete understanding of equipment, cements, and so forth. Should also have knowledge of combining shoe fabrics. All replies held confidential. Address Box No. 1075, care of INDIA RUBBER WORLD.

RUBBER CHEMIST—VARIED COMPOUNDING EXPERIENCE for Customer Technical Service Laboratory. Experienced in tires, tubes, rubber footwear, mechanical goods and wire insulation desirable, although all not necessary. Location Southwest. Salary open. Address Box No. 1083, care of INDIA RUBBER WORLD.

RUBBER SOLING MANUFACTURER NEAR NEW YORK WOULD like to make arrangements with good consulting chemist with thorough knowledge of soling manufacturing. Address Box No. 1084, care of INDIA RUBBER WORLD.

SOLING MANUFACTURER NEAR NEW YORK REQUIRES SEVeral men: Plant superintendent, chemist, foreman, and general manager. Please address Box No. 1085, care of INDIA RUBBER WORLD.

RUBBER CHEMISTS FOR MECHANICAL RUBBER GOODS, molded and extruded, in an expanding plant. Send résumé and salary expected. Address Box No. 1090, care of INDIA RUBBER WORLD.

MECHANICAL OR CHEMICAL ENGINEERS FOR PRODUCT design and quality control in an expanding mechanical rubber goods plant making molded, extruded, die cut, fabricated, and pneumatic items. Send résumé and salary expected. Address Box No. 1091, care of INDIA RUBBER WORLD.

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COMPENSATION BASIS WILL BE SUITABLE SALARY AND EXPENSES PLUS BONUS. REPLIES WILL BE TREATED IN STRICTEST CONFIDENCE.

OUR OWN EMPLOYEES KNOW OF THIS ADVERTISEMENT. ADDRESS: BOX NO. 1086, c/o INDIA RUBBER WORLD.

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LATEX TECHNOLOGIST—CHEMICAL ENGINEER OFFERS HIS experience in the production of latex articles. Well qualified in all phases of development and manufacture. Specialties include adhesives, coatings, wire and cable, thread, dipping, rug backing, and others. Particularly interested in sponge, paper and latex base paints. Proven record of achievements. Numerous patents. Location immaterial. Address Box No. 1076, care of INDIA RUBBER WORLD.

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EXECUTIVE—OVER TWENTY YEARS' EXPERIENCE BUYING and selling crude rubber, latex, and kindred products, also represented large American rubber manufacturers in foreign markets; seeks position in same or allied field. Familiar with domestic and foreign markets. Willing relocate. Linguist. Excellent references. Address Box No. 1087, care of INDIA RUBBER WORLD.

PRODUCTION MANAGER DESIRES NEW CONNECTIONS. capable as technical director of production or development. Twenty years of broad practical-technical experience manufacturing mechanical and sponge rubber products. Familiar with all phases of the industry from compounding to finished product. Address Box No. 1088, care of INDIA RUBBER WORLD.

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Continued

SITUATIONS WANTED (Continued)

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RUBBER TECHNOLOGIST, 34 YEARS OLD, WITH TWELVE years' experience in most phases of mechanical rubber products, desires responsible position. Experience includes compounding, development, processing, supervision, purchasing, and sales service. Address Box No. 1092, care of INDIA RUBBER WORLD.

TECHNICAL SALES AND/OR SERVICE POSITION DESIRED by rubber chemist with excellent development and sales service background to the rubber and allied fields. Address Box No. 1093, care of INDIA RUBBER WORLD.

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FOR SALE: NEW LABORATORY MILLS AND CALENDERS, Banbury Mixers, Mills, Calenders, Laboratory Mill and Banbury Unit, Extruders, Tubers, Hydraulic Presses. Send for detailed bulletin. EAGLE INDUSTRIES, INC., 110 Washington Street, New York 6, N. Y. DIGBY 4-8364-5-6.

FOR SALE: 1-ROYLE #3 PERFECTION EXTRUDING MACHINE with herringbone-gear drive. 1-Royle #5 perfection extruding machine with herringbone-gear drive and 125 h.p. motor. Address Box No. 1078, care of INDIA RUBBER WORLD.

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Otto J. Lang, General Mgr.

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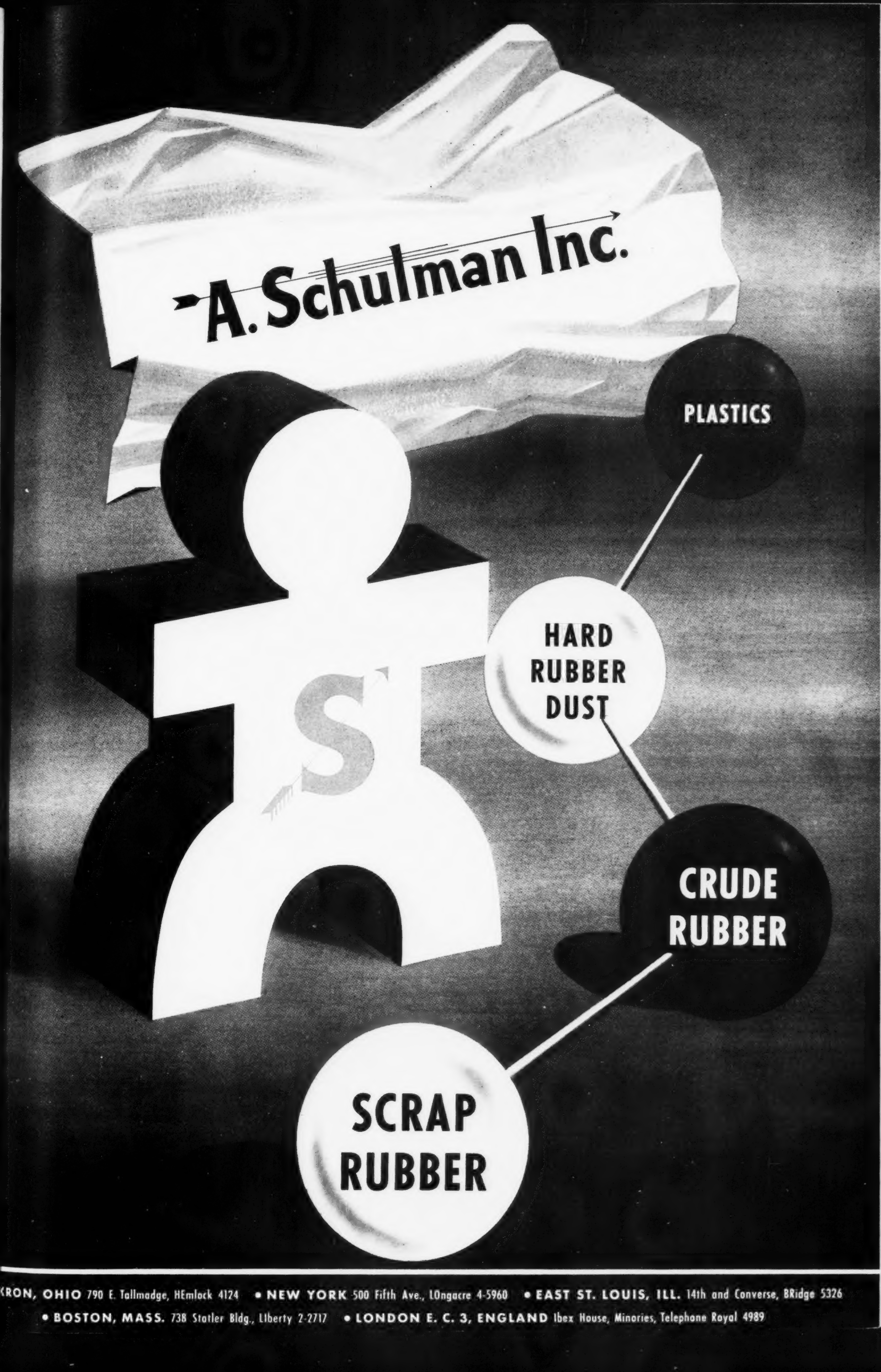
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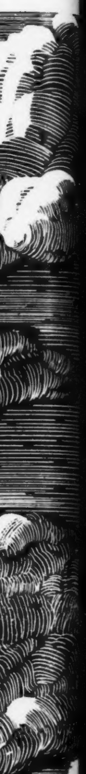

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